

## Developers Point To Microsoft OLE Deployment Edge

BY STUART J. JOHNSTON

Concerns about Microsoft having an unfair advantage over third-party developers surfaced again last week when some competitors complained that the company had a head start in implementing embedded linking technology in its applications.

Developers began receiving beta versions of the Object Linking and Embedding (OLE) code in the form of Windows Dynamic Link Libraries in December. But as early as last summer, Microsoft was shipping PowerPoint for Windows, which included a preliminary version of OLE.

Microsoft also had the advantage of being capable of beginning work on hardwiring a completed OLE implementation into Excel 3.0 before December, developers said.

See OLE, Page 89

## THIS WEEK Enterprise

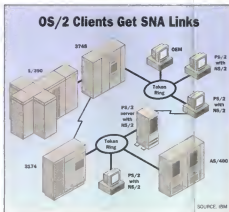
This month's Enterprise Computing supplement follows the growing trend toward downsizing host-based applications to run on PC LANs. See section following Page 46.



### THE NEXT WAVE

Industry watchers are predicting the next boom will be in "content-based" software — full encyclopedias, books, text databases, all available on CD ROM discs.

See Page 47.



SOURCE: IBM

## Microsoft Licenses Font System for Matching Type

BY KRISTI COALE

Microsoft has licensed font-classification technology that will make it easier for users to get the best available match to the font they want, officials confirmed last week.

Panose, developed by Elseware Corp. of Seattle, employs a scheme similar to those used in the sciences, where plants and organisms are organized according to various traits.

In the type world, fonts are broken down by their visual characteristics, including serif style, weight, proportion, and x height. Each typeface is assigned a Panose number according to these traits. "We needed a numerical mechanism to see what a typeface looks like," said Ben Bauermeister, Elsewhere founder and developer of Panose.

Panose will be able to offer users a "best fit" solution when

See Font, Page 89

## 1-2-3 for Windows to Go Into Beta With Hopes for Summer Release

BY BARBARA DARROW

Nearly one year after Windows 3.0's debut, Lotus Development Corp.'s 1-2-3 for Windows is approaching the beta-test stage. The spreadsheet giant hopes a Windows version of 1-2-3 will stave off challenges from Micro-

soft Excel 3.0.

Beta testers of the new 1-2-3, code-named Rockport, expect to have it by month's end. Lotus officials point to a summer release of the finished product.

Although some large customers have moved from 1-2-3 to Excel, many seem to be waiting to see 1-2-3 for Windows.

"There are certainly customers leaving Lotus for Excel, but the fundamental issue is that they're going to Windows and will go to the best spreadsheet at any particular time," said one large reseller. "Nobody is upgrading 100 percent of their

See 1-2-3, Page 89



## PostScript Languages

InfoWorld presents a tutorial examining the differences between PCL 5 and PostScript. See Page 55

## IBM Opens Its SNA Door To Non-IBM PCs, LANs

Brings OS/2 Extended Edition Into the Fold

BY BARBARA DARROW

IBM last week took a major step toward opening its Systems Network Architecture (SNA) worldview to include non-IBM LANs and computers.

SAA Networking Services/2, Version 1 comprises IBM's Advanced Peer-to-Peer Networking (APPN) for OS/2 Extended Edition; the Advanced Program-to-Program Communications (APPC) protocol; and a version of IBM's Common Program Interface for Communications (CPI-C) for OS/2.

APPN is IBM's distributed networking scheme that allows direct communication between any user on the network, and allows any device to be config-

ured as a network node — capable of routing network traffic — or an end node.

"APPN, at the middle layer of the architecture, does the networking, while APPC, or LU 6.2, the application protocol, runs on top," explained Rick McGee, manager of communications systems architecture for IBM.

Previous versions of APPN were available for System 36 minicomputers and midrange AS/400s. This announcement brings OS/2 Extended Edition — and therefore PS/2 workstations — into the fold, noted David Passmore, principal with Ernst & Young Network Strategies, in Fairfax, Virginia.

See IBM, Page 89

## Microsoft Scrambles Onto Multimedia Authoring Boat

BY NICO KROHN  
AND LISA PEARLLE

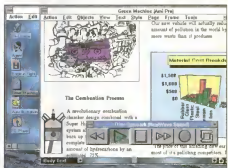
After using third parties to create Windows multimedia authoring tools, Microsoft is preparing its own \$99 product, code-named WinDoc, that will challenge products that carry price tags as high as \$8,000.

The company showed pri-

vately an alpha version of the WinDoc authoring tools last week at the Windows & OS/2 conference in San Jose, California, and to content publishers late February.

At its expected low list price, WinDoc will sell for much less than existing systems. According to sources briefed on the

See Microsoft, Page 8



HP's multimedia New Wave will be postponed because of delays in Microsoft's multimedia extensions to Windows. See page 89.

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## Getting Your Wings

InfoWorld tests 8 powerful 386SX notebooks that make great traveling partners. **See Page 55**

MARCH 4, 1991

FOR POWER BUYERS OF PC AND NETWORKING PRODUCTS

VOLUME 13, ISSUE 9

## First PC Designs For Pen Windows May Look Familiar

BY NICO KROHN

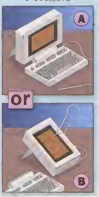
Hardware manufacturers are readying pen-based systems that closely resemble traditional laptop-size computers instead of upsize electronic clipboards.

These "transitional" machines will include a keyboard and will open like laptop computers, said Pradeep Singh, group product manager for Microsoft Corp.'s Pen Windows product unit, who claims to have seen prototypes from several companies.

Last week, Microsoft announced that 21 computer manufacturers will license the Pen Windows operating system.

Unlike common notebooks, **See Pen, Page 97**

## Prototype 2-in-1 Pen-Based Portable



## 40-MHz 386 Clone Ready; Systems to Ship in April

BY TOM QUINLAN  
AND BARBARA DARROW

Advanced Micro Devices is expected to announce its clone of the Intel 386 this month. Systems using the 386DX chip substitute will hit the market in April.

The company will release both 25- and 40-MHz versions of the 386 chip during the week of March 25, sources say. Currently Intel Corp.'s fastest 386 is a 33-MHz chip. AMD's chip prices will be comparable to Intel's, sources added. The 40-MHz version will be positioned to challenge Intel's expected stripped-down 486 chips, code-named the P23 and P24.

It is unclear what AMD will call its 25- and 40-MHz chips. Intel has sued to prevent the company from using 386 in its products' names.

An AMD spokesman said the company had not set a date for the introduction.

The absence of a final name or any price break, however, is not keeping systems vendors from working with the chips. The 386 DX is still on allocation by Intel, so AMD's will simply feed a hungry market.

"What matters is that we will be getting the chip in quantities and a more powerful version of the 386 with AMD's 40-MHz design," said one system manufacturer, who wished to remain anonymous.

"[AMD has] to be careful not to position themselves as the cheapo alternative," said Richard Shaffer, editor of the New York-based *Computer Letter*. "They must command at least as good a price, maybe a price premium, and also an engineer-

**See 386, Page 97**

## IBM Strikes Back With OS/2 Blitz

Campaign Designed to Win Over Corporate 'Hearts and Minds'

BY ED SCANNELL

IBM is preparing a massive marketing campaign to finally establish OS/2 as the operating system of choice for corporations.

Beginning in early spring, IBM will stage a series of educational seminars and high-power marketing and promotional campaigns to convince developers and large corporate accounts of OS/2's benefits and strategic importance. The massive, year-

long campaign will be fueled by at least \$40 million, according to sources.

As part of the seminars, IBM will bring in a variety of corporate and third-party developers who will "give witness" to OS/2 by showing off what IBM considers to be its "solution or application success stories," sources said.

There will be little attention paid to Windows during this campaign, although IBM will stress it can offer users and

developers a "better Windows than Windows" — using OS/2 as the engine to drive existing Windows-compatible applications.

This year IBM plans to provide better Windows compatibility for OS/2 2.0 through a porting layer that allows many Windows device drivers to work with OS/2. The lack of good device drivers has long haunted OS/2.

Micrograph Inc., which has **See IBM, Page 97**

## FIRST LOOK

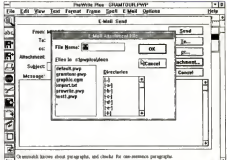
### SPC ProWrite Plus Packs Extras For Midrange Users

BY MICHAEL J. MILLER

Software Publishing Corp.'s Professional Write Plus is staking out a middle ground in Windows word processors by including such extras as a built-in grammar checker and electronic-mail connection.

ProWrite Plus doesn't share much with the DOS version of Professional Write. Instead, it is built on code used in Samas Corp.'s Ami — the low-end version of Ami Professional. However, SPC has made the menus and icons a bit more straightforward than those in Ami.

Professional Write Plus has just about all the major word processing features — and then



An electronic mail connection to MHS is one of the unique features of Software Publishing Corp.'s Professional Write Plus.

some. It lets you define and change templates with multiple styles, then apply those styles to paragraphs. You can set several options in those styles, including fonts, alignment, spacing,

breaks, notations (for such things as outline numbering), lines before and after paragraphs, and activating hyphenation.

**See First Look, Page 97**

## THIS WEEK



### THE POWER OF THE PEN

The ability to use a pen to operate a PC is finally on the horizon, and so is a battle between an industry heavyweight and a courageous newcomer.

## DRI Adds Multiuser Tools to DR DOS; MS DOS 5.0 Release Slips to June

BY ED SCANNELL

Trying to maintain its technology lead over Microsoft Corp., Digital Research Inc. last week unwrapped a multiuser, multitasking version of DOS.

For its part, Microsoft last week briefed dealers on its release plans for DOS 5.0, which matches many of the features of current DR-DOS.

Replacing Digital Research's Concurrent DOS 386, DR

Multiuser DOS lets 80386SX-based systems and above support a mix of 10 terminal and PC users simultaneously. Each node supports eight independent DOS sessions, each one protected from the others.

"For small groups of users, this product offers an economical solution," said Dick Williams, DRI's president and CEO, adding that a 10-user system costs about 40 percent of

**See DOS, Page 97**

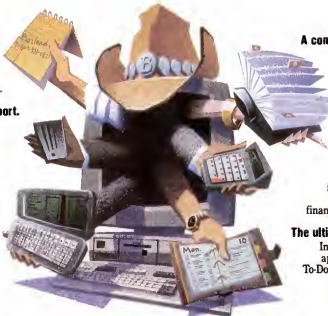
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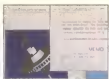
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## AT DEADLINE

# Microsoft, Logitech Ready Small Trackballs

Both Microsoft Corp. of Redmond, Washington, and Logitech Inc. of Fremont, California, are readying trackball products especially suited to laptop and notebook computers. Next week, Microsoft will release Ballpoint, a small trackball that can be mounted on either the right or left side of a keyboard. In early April, Logitech will announce a similar pointer that is "right- and left-hand capable," a source at Logitech said. Unlike Microsoft's pointer, the Logitech trackball can also be used stand-alone or held in the hand, the source said.

—Mark Brownstein

## IBM to Unveil APNN for OS/2 EE

Tomorrow IBM Corp. is expected to announce a version of its Advanced Peer to Peer Networking (APNN) for OS/2 Extended Edition, joining versions for its AS/400, System 38, and System 38 platforms. "This builds on the Type 2.1 node capability that's already in OS/2 EE's Communication Manager, adding an intermediate node-routing capability," said one analyst familiar with the product. "It's not quite plug-and-play SNA but it's getting pretty close."

—Barbara Darrow

## Apple to Ship System 7 on May 13

Apple Computer Inc. is set to ship its long-awaited System 7.0 to end-users on May 13, the opening day of its International Developers' Conference, said sources close to the company. On this day, end-users can get the \$50 software through dealers. In an unrelated move, Apple named Daniel L. Eilers as president of Claris Corp.

—Kristi Coale

## Big Blue Previews Signature

Last week, Fernand Sarraz, vice president of IBM's desktop software unit, previewed DOS and Windows word processors resulting from IBM's alliance with Xyquest. Pricing and availability were not disclosed. Signature for DOS, now in beta test, boasts some Windows-like talents — mouse support, editable WYSIWYG mode, dialog boxes, Blisterum fonts — but runs in 640K. Sarraz said. An alpha version of a future Windows product — with a customizable icon ribbon — is making the rounds of large customers.

—Barbara Darrow

## HP Links to Retix OpenServer 400

Hewlett-Packard OpenMail Server users will be able to route their X-400 electronic mail messages to other E-mail systems via a link with Retix's OpenServer 400 message server, the companies announced last week. Messages can be sent to any system that offers an X-400 gateway, including ccMail, WordPerfect Office, and Netware MHS. Both products ship next quarter. HP OpenMail, Release 1.1 for SCO Unix costs \$2.395; prices for Retix's OpenServer 400 for SCO Unix 3.2 start at \$6,995.

—Jodi Mardesich

**EDITOR'S NOTE:** After an internal policy review, InfoWorld has modified its long-standing practice regarding the spelling of company and product names. Beginning with this issue, internal capital letters and initial lowercase letters will be used according to the style preferred by the company. Names with internal punctuation marks or all uppercase names (unless the word is a true acronym) will continue to be spelled according to standard English usage.

These changes are designed to serve readers by promoting easier comprehension of the many product and company names published in InfoWorld.

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# NEWS

## Compaq Develops Troubleshooting Aid for SytemPro

By David Coursey

Troubleshooting a Compaq SystemPro may someday be as easy as attaching a special monitoring device and reading its display, much as mechanics do with automobiles.

Adding sophisticated system management features to the multiprocessing server is a top priority for the company, said Mike Perez, director of systems technology at Compaq. He said the company is already beta-testing a device that provides performance statistics, such as disk, CPU, and network utilization through a dedicated serial port.

While it may never become an actual product, current tests are likely to yield a systems management add-on board, which may include actual remote control features as well, Perez said.



Compaq's Mike Perez: Top priority is management tools.

SystemPro buyers are used to mainframe capabilities, and are asking for them, Perez said. Because of this, customers can expect more high-end add-ons.

For example, the company recently announced drive arrays capable of giving the machine up to 20 gigabytes of on-line storage, a figure Perez wants to see doubled. While few users have need for such storage today, making it available illustrates Compaq's willingness to build features that future high-end applications will require.

## Compaq Denies Involvement In RISC Workstation Coalition

By David Coursey

Compaq Computer Corp. officials last week sidestepped questions regarding earlier published reports that confirmed the company's involvement with a MIPS RISC coalition.

Last week the *Wall Street Journal* published a report that quoted new Compaq COO Eckhard Pfeiffer, confirming that Compaq had joined a group dedicated to designing a standard architecture around the MIPS RISC chip.

However, the story was "not accurate," and Pfeiffer's remarks could not be considered confirmation of such a workstation coalition, said Compaq spokesman Bob Beach.

Beach declined to comment on whether Compaq was involved in such a coalition or if Compaq is discussing such issues with workstation vendors.

Other Compaq executives last week played down talk concerning Compaq and RISC architecture machines. "The problem with RISC is that Sun Microsystems Inc. has done a pretty good job creating the perception that RISC offers much higher performance," said Mike Perez, director of systems technology. Compaq isn't certain performance advantages exist that cannot be equalled by the Intel architecture, he said.

Though Compaq is investigating a variety of RISC technologies, the company doesn't see a large enough market to support releasing a product in the near future. "What software would they run?" Perez said.

Compaq has, however, made its feeling known to Intel that certain RISC features could be used to improve the performance of X86-family processors.

## HP to Unveil 17-PPM Network Printer

Near 600-DPI LaserJet IIIi Uses Canon Engine, RISC Processor

By Kristi Coale

Beefing up the performance of its LaserJet line, Hewlett-Packard and Co. will unveil today the LaserJet IIIi printer.

The \$5,495 IIIi is based on a 17-page-per-minute (ppm) Canon engine, features an AMD 29000 RISC main processor, and comes standard with an enhanced version of PCL 5 and HP's patented Resolution Enhancement Technology (RET), according to the company.

This summer HP will offer a printer model with a factory-installed ROM-based version of Adobe PostScript and 2 megabytes of RAM that will list for \$6,595; for now, users can get the \$895 PostScript upgrade from dealers.

Using the RISC-based controller board, the IIIi can maintain its 17-ppm speed even when printing complex graphics, particularly under PCL 5, HP said.

The IIIi is designed for a shared environment, and has enhanced reporting capabilities that let network users know if something has gone wrong with

a printing task, the company said.

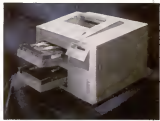
HP will also offer Ethernet and token ring network interface boards, which support both NetWare or LAN Manager. Both boards are currently shipping, with the Ethernet selling for \$695 and the token ring card (running at either 4 or 16 megabits per second) carrying a list price of \$795. In the fall, HP will release an AppleTalk interface that will let users hook into a Macintosh network. Pricing has yet to be determined.

Among the third-party products available is Digital Products Inc.'s LAN-Sprint Server board, which speeds up graphics printing or font downloading operations, and supports up to six parallel printers. Others, such as Extended Systems' BridgePort, offer mixed computing environments a way to hook up both Macintoshes and PCs to the

to IIIi.

HP also improved the LaserJet's resolution. In addition to RET, the IIIi has a microfine toner that aids in boosting the 300-dot-per-inch (dpi) standard resolution to close to 600 dpi. Unlike others, this \$169 toner cartridge has a finer grain of toner that is less likely to scatter, yielding sharper edges on characters and graphics.

Hewlett-Packard Co., 19310 Prunefield Ave., Cupertino, CA 95014; (800) 752-0900.



HP's LaserJet IIIi brings near-600 dpi resolution to the departmental printer.

## Synoptics Enhances Distributed Network Management Tools

By Yvonne Lee

Synoptics Communications Inc. will introduce today a Sparc-based hub module and a range of applications for managing Ethernet and token ring networks from the same console.

Central to Synoptics' network management strategy is the LattisNet System 3000 Network Control Engine (NCE), which distributes the burden of managing network information across the network. The \$995 module works with the LattisNet System 3000 intelligent hub and looks for vital, predefined information to be passed on to the network management station.

Local processing of management information minimizes the traffic on the network and

assures that only high-level information is sent to the network management station, the company said.

The NCE can access all three Synoptics System 3000 hub backplanes, including Ethernet, token ring, and FDDI. This will allow it to pass information from all three network architectures to the appropriate software management package. The unit will ship next quarter.

Synoptics also announced a set of network management software packages.

One of them, LattisNet Advanced Network Management, is designed for complex networks with multiple segments, differing protocols, and restriction sections for security or mission-critical applications. It runs over Windows 3.0, is priced

at \$5,000, and will ship next quarter.

A second, LattisNet Basic Network Management, is designed for networks of fewer than 200 nodes. It offers the network administrator several views of the network, including Static Network Views, Ring Views, and Expanded Views of activity throughout the network.

LattisNet Basic Network Management is available now at a retail price of \$2,295. A third module, LattisNet Network Management for Unix, is built over the SunNet Manager platform. Because it uses the multitasking Unix environment, it is particularly suited to monitoring and managing large networks, such as those that would benefit from the NCE, the company said.

## Low-End Competitors Force IBM to Reduce Prices on Its PS/2 Models

By Ed Scannell

Responding to competitive pressures, IBM last week cut prices on most of its PS/2 models, including a healthy 14 percent reduction on its best-selling Model 55SX.

The price cuts, which range from 5 to 20 percent, affected all

members of the PS/2 family except the \$8386SX Model 70 and the Models 90 and 95, introduced last October.

The pricing action brought the Model 55SX, with 30 megabytes of storage capacity, down to \$2,995 from \$3,495. The 60-megabyte version was reduced to \$3,295 from \$3,895.

The price cuts came in response to low-end competitors whose \$8386SX-based systems are eating into IBM's market share from below.

Some observers believe these cuts foreshadow new systems from Big Blue. Several dealers expect IBM to unveil several new machines in the first half of

this year including followups to the Models 55SX and 70.

"There is a lot of pricing competition with SX machines from companies like AST and Hyundai," said Matt Fitzsimmons, a Computerland dealer in White Plains, New York.

Prices for the Model 65SX will now range from \$4,445 for a

16-MHz 386SX model with a 60-megabyte hard drive, to \$6,745 for a Model 65SX with a 320-megabyte hard drive.

The Model 80 will now be priced at \$5,495 for a 20-MHz 386 model with a 80-megabyte hard drive, to \$11,495 for a 25-MHz system with a 320-megabyte drive.

# IBM Tries to Jump Start XGA Development, to Supply Chip Set

BY TOM QUINLAN  
AND NICO KROHN

In one bold move, IBM has tried to freeze the future of PC graphics in its own image, placing the future of 8514/A — its orphaned graphics standard of late 1987 — in a precarious state.

Last month an IBM official told the Video Electronics Standards Association

(VESA) that the company would become an OEM supplier of the XGA chip set. (See "IBM Moves to Supply XGA Products to OEMs," February 25, Page 3.) Many VESA developers now say it's virtually assured that they will quickly start an XGA development effort.

The IBM offering would consist primarily of two ASIC chips that some developers estimated would have a price

of \$200. By offering a noninterlaced ISA version of XGA at a nominal cost, IBM gives users high-resolution graphics and 16-bit color for the desktop while aggressively seeking to promote its own vision of the PC's future.

Some manufacturers are already anticipating a raft of XGA-close products to be announced at Fall Comdex, with delivery expected early in 1992.

"I think the technology is going to be available a lot sooner than people expected, but I think the price is going to be higher," said Darwin Chang, director of product marketing for Genoa Systems.

However, even companies conceding that IBM's promise of near-term XGA technology is too good to pass up are concerned about the lack of technical information coming from IBM.

"I'd say we're going to do it because we don't have that much of a choice," said one developer. "But I'm a little bit worried, because IBM has made it clear that it doesn't intend to give us technical information about the future directions of XGA. We would learn about XGA enhancements when IBM is ready to sell us a product, but not before."

As quickly as some third-party developers rushed to embrace XGA, others insisted that the market has moved past IBM's capability to set a de facto standard.

"The question today is software compatibility," said Dale Mehl, general manager of the graphics processor group for Weitek — a manufacturer of high-end graphics products for such companies as Silicon Graphics Inc. — and intends to offer a more broad-based graphics product later this year.

IBM's XGA announcements will deal a heavy blow to its own 8514/A, developers also believe.

"IBM's 8514/A is a dead product," said Michel Castro, a senior industry analyst for Dataquest. Although existing 8514/A products could fill a profitable niche for the next two years, "a company would be foolish to begin developing an 8514/A product today," said Castro.

Even the name 8514 may now be seen as a drawback.

"The name 8514/A may have some negative connotations, [and] some vendors will package themselves as something different by changing the product name, i.e., to Windows Accelerator, and de-emphasizing certain aspects of the product," said Jake Richter, president of Londonderry, New Hampshire-based Penace Inc., which develops drivers for various graphics standards.

Although developers will probably focus on the prospect of an XGA product now, it will take at least a year for products to hit the market, cautioned Keith Angelo, graphics operation marketing manager for Chips & Technologies Inc. "While 8514/A won't be as large as XGA, it's going to be an important product for the next year or two."



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### What Graphics Vendors See

- 8514/A becomes an interim/niche solution
- XGA established as PC graphics standard virtually overnight.
- ▲ Part of IBM's multivendor push: export more sophisticated graphics and animation on PCs.

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## AT&T Claims X Window Patent Rights

BY PATRICIA J. PANE

AT&T threw a monkey wrench into MIT's X Window System, warning that the interface may infringe upon a 1985 Bell Laboratories patent.

AT&T's patent covers the "backing-store" functionality on overlapping windows. In its February 7 letter, the company suggests X Window developers license the technology from AT&T.

The letter was standard business practice, said Al Herron, manager of intellectual property at AT&T, in Short Hills, New Jersey. However, Herron acknowledged that it marked the first time each member of the X Consortium

had been contacted on an individual basis about licensing.

The letter is aimed at any use of the patented technology, whether implemented internally or commercially, Herron said. Several members of the consortium already license the patent, and that licensing could be resolved by cross-licensing agreement, he added.

MIT doesn't charge for its X Window System, a building block for developers that has evolved into a de facto open systems standard.

MIT, along with many others, is still formulating its response and refused to comment, according to Richard Scheifler, director of the X Consortium at MIT, in Cambridge, Massachu-

setts. "We didn't go out there with the idea of taking anyone's copyrighted material," Scheifler said.

Some members of the X Consortium have large patent libraries, so they may respond to AT&T with their own charges and cut a cross-licensing deal, according to David Card, an analyst with International Data Corp. (IDC), in Framingham, Massachusetts.

AT&T's actions aren't expected to derail the progress of X, said Peter Burris, IDC's director of IBM research. "X will probably happen within certain places in the industry. My sense is that AT&T is saying 'This is my ball, let me play, or I'm taking my ball home.'"

## Gupta Preps SQLBase 5.0, Overdue Beta Set for April

BY SCOTT MACE  
AND LOUISE FICKEL

Gupta Technologies is trying to tie up some loose ends with the next release of its database server, now designated SQLBase 5.0. At the top of its list are NetWare 386 and Unix versions, as well as referential integrity.

Although Version 5.0 has not yet been officially announced, Gupta has talked about and demonstrated progressive alpha versions of the package for months, most recently during last week's joint launch of SQL-Base for Btrieve with Novell Inc. (See "Novell, Gupta Announce Joint Database Product," Page 29.)

At Comdex 1989 Gupta announced that a Unix version of SQLBase 4.0, which is available for DOS and OS/2, would ship

early in 1990, and that a NetWare Loadable Module (NLM) version for NetWare 386 would ship in mid-1990.

Neither of those products have yet shipped. By the time Gupta held its developer conference last August, SQLBase 4.1 was in development; that version added cursor context preservation and a router for single-user SQLBase. Officials also said that SQLBase 4.3 would enforce referential integrity.

A month later, Gupta officials said they had pushed the SQLBase Server NLM beta-test release to the first quarter of 1991.

Now that beta release has slipped to April, and the company has renamed the product SQLBase 5.0. Gupta has targeted October as the final ship date for production releases. More features have been added, in-



CEO Umang Gupta: SQLBase 5.0 was delayed by coding-style changes to support Unix

cluding a significantly enhanced query optimizer, said Umang Gupta, president and CEO of Gupta Technologies, in Menlo Park, California. Also added is support for the double-byte character set used to internationalize SQLBase applications.

Gupta said that changes in coding style needed to port SQLBase to Unix meant that all other versions of the server had to be upgraded at the same time.

"We want to make sure that it's absolutely solid before it gets out," said Gupta.

## Business Market Applications for ISDN

- Banking
- Insurance
- Government
- Military
- Manufacturing
- Retail

Credit authorization, account reconciliation  
Agent support, claims processing  
Budget negotiations  
Service records  
Customer support  
Point-of-sale support

SOURCE: NYNEX

## Vendors Publish Spec For Enhanced SDN

BY BARBARA DARROW

In an effort to breathe life into the sluggish ISDN market, a coalition of switch makers, telephone providers and computer vendors last week pushed for national deployment of ISDN by 1992.

Representatives from AT&T, Bell Atlantic Corp., Bellcore, Digital Equipment Corp., IBM Corp., Northern Telecom Inc., Nynex Corp., and others—under the aegis of the Corporation for Open Systems—announced a set of detailed specifications that they hope will make possible a wide-scale ISDN implementation, called ISDN-I.

These guidelines will ensure that ISDN-capable switches from different suppliers work together.

ISDN enables the simultaneous transmission of voice and data over one wire. It has been around for 10 years, but the AT&T divestiture in 1984 and other issues have hindered its acceptance, according to John Seesholtz, vice president of technology and information ser-

vices for Bell Atlantic. There are currently about 200,000 ISDN lines deployed, he estimated.

For computer vendors, a set-in-stone standard ensuring interoperability between switches will ease product development. "[Until] now we've had to be sensitive to which switch was in the network," said Mary A. Patterson, director of ISDN systems for IBM Corp. "Now there's consistent way to attach to the network."

Large companies could use ISDN to supplement existing networks, supporters noted.

Some, however, are not convinced ISDN-I will prompt greater acceptance. "People who wrote the standard hoped it would wipe out the private network market by drawing business users back into the public network with a flexible mixture of voice and data capabilities," said Kenneth Bosworth, president of International Resource Development Inc., in New Canaan, Connecticut. "But it didn't work out that way. It is fine for niche applications, but it's not a mainstream solution."

## Windows, Windows Everywhere, But OS/2 Dry Spell Continues

BY THE INFO WORLD STAFF

SAN JOSE, CA—This week's Windows & OS/2 Conference will have a definite Windows bent, as few offerings are expected for OS/2.

Ventura Software Inc. will use the show to announce incremental upgrades to the Windows and OS/2 versions of Ventura Publisher. Added to the Windows release is support for the Hewlett-Packard LaserJet. Ventura Publisher for OS/2 will include new network nodes, according to sources briefed on the company's plans.

RasterOps Corp. will introduce an enhanced version of its 24-bit ColorBoard 1024MC graphics board, which moves data on-screen up to eight times faster than the previous version.

Three-D Graphics is expected to announce three licensing agreements for its Windows and

OS/2 graphics engine. Users can expect to see several products based on the engine, including a Windows-based graphics package from Fox Software Inc., according to sources close to the company.

Zenographics Inc. will announce that it is shipping versions of SuperPrint, Version 1.1 for a wide range of color output devices including Calcomp's color thermal printers and Presentation Technologies' Montage slide maker.

The ISoft Corp. will deliver I Team, the company's new productivity tool for DOS, Windows, and OS/2. The \$295 program allows users with any mix of workstations and all three editions of the program to share a common user interface. Users of I Team can plan, coordinate, and track workflow, use a calendar, a notebook, and a word processor.

## Fonts Take Seybold Show Center Stage

BY KRISTI COALE

BOSTON—Apple Computer Inc.'s True Type scalable font technology will finally have its day at this week's Seybold Conference here, while Adobe Systems will have something up its sleeve with an enhancement of its Type 1 format.

Adobe is expected to announce "optical-scaling" technology for its Type 1 fonts, sources outside the company said. With this technology, fonts at various extreme sizes will look better.

Adobe declined to comment on its Seybold announcements. True Type support will come from Apple/CompuGraphic and

Bitstream Inc., which will announce their intention to provide libraries to users within the new, Apple/CompuGraphic's Apple format of its Desktop Series is due out with some True Type fonts by midyear.

Bitstream plans to have its library of fonts available in Type 1, Speedo, and True Type formats by the end of the year. Some True Type fonts for the Macintosh will ship this spring. Pacific Data Products will introduce PacificPage XL for the LaserJet. Outfitted with an Intel 80486 KB RISC-based processor, PacificPage XL divides the PostScript interpretation tasks between its own processor and the printer's Motorola

68000 processor.

Other printer-related announcements will include Electronics For Imaging's (EFI) introduction of the Fiery Color-Laser controller, a MIPS R3000 RISC-based board that turns plain-paper digital color copiers into color PostScript laser printers. Fiery ColorLaser currently works with the Canon Color Laser Copier.

Custom Applications Inc. will show a prototype Windows 3.0 version of Freedom of Press, its PostScript-compatible interpreter. The Windows version is slated to ship in the second quarter.

Barbara Darrow and Scott Mace contributed to this article.



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**HEWLETT  
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## SOFTWARE

## TECHNOLOGY UPDATE

## Problems With Rasterizers Arise

Users Encounter Confusion With Windows-Based Type Managers

BY KRISTI COALE

Windows users may just be getting their feet wet in fonts and font-scaling technologies, but based on their preliminary experiences, they have found the vendors also still have a few kinks to iron out.

For example, users of the Hewlett-Packard LaserJet II series or earlier models who also use Adobe Systems Inc.'s Adobe

Type Manager (ATM) 1.0 for Windows may experience printer errors when ATM generates its fonts on the fly.

The Series II and earlier HP printers cannot handle all the complex operations involved in on-the-fly font generation and will often yield an Error 21, according to user Brian Mahoney, proprietor of Computer Chargeback, a VAX software reseller in Seal Beach, California.

To remedy this problem, users need to be able to prebuild and predownload fonts to their printers, a capability that does not ship with ATM, according to Mahoney.

Adobe, however, does offer a free, separate utility, Font Foundry, to users purchasing its Plus Packs and those calling the customer service line: (415) 961-4992.

Font Foundry contains tools for building these fonts, including an Adobe Font Metric (AFM) file.

Preinstalling fonts—generating each font before sending it to the printer—means that users alleviate the complexity of building a font for a printer. However, experts call this a less-than-elegant solution.

According to Adobe, this

error results from a shortage of memory; users can circumvent the need to prebuild fonts by simply adding memory to their LaserJets.

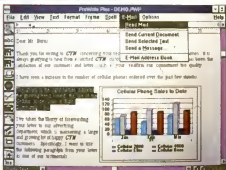
Bitstream's FaceLift, a Speedo font rasterizer that comes with the capability to build fonts, has also reportedly caused some difficulties, according to users of Ventura Publisher.

When creating a document using italicized type, the spacing between characters is awkward and not easily remedied by kerning. According to Bitstream technical support, this problem originates with FaceLift and not with Ventura.

Although it would give no specifics about alleviating this problem, Bitstream indicated that the fix could come in a future version of the rasterizer.

**FIXES ON THE WAY.** That such confusion and problems are arising is not a surprise to some, including Jesse Berr, publisher of the Windows Watcher newsletter in Redmond, Washington, who feels these issues may be moot with the upcoming release of TrueType. Berr cites the fact that TrueType, as a rasterizing technology, will be a part of the standard operation system and will see fewer compatibility problems with applications.

But throwing in an additional rasterizer will only serve to exacerbate the problems users face now, said Ben Bauermeister, founder of Elseware, a software company in Seattle. □



Thanks to built-in MHS support, Pro Write Plus users can send and receive E-mail messages without having to exit the application.

## SPC Rolls Out High-End Windows Word Processor

BY LISA PICARELLE

SAN JOSE, CA — Nine months after licensing Samna Corp.'s technology to accelerate its move into the Windows market, Software Publishing Corp. will unveil its Professional Write Plus Windows-based word processor at the Windows & OS/2 Conference here this week.

One of the key features of this program is its capability to link to existing E-mail systems via MHS. This lets users send and receive messages and attached files without exiting the application. Professional Write Plus will also automatically display a file in its native format by launching the application used to create the file, if it's available on the user's machine or the

network, according to Bill Dawson, product manager.

The E-mail capabilities of the program so impressed beta site Northwestern National Life Corp. that the company is now looking for an E-mail package to work with Pro Write Plus, said Dave Garrison, an information systems consultant for the firm.

Although the \$249 program provides users with pull-down menus, it also sports an icon bar along the left side of the screen. This customizable icon bar gives users quick access to frequently used tools and functions.

Professional Write Plus also features improved font and graphics controls. When selecting font sizes and styles, users view a dialog box with a representation of the new font before applying the style to the document. For placing graphic frames on a page, users can select from predefined style sheets or place graphics anywhere on the page. Frames can also be used for text. Users can move and rotate images within the frames, as well as adjust the aspect ratio of images if a frame is resized.

The program also features several modes for viewing information, such as working mode, which is 91 percent of standard WYSIWYG mode size. Users can also display documents in layout, draft, and enlarged mode—all of which are fully editable. In addition, Pro Write Plus includes a spelling checker, thesaurus, and grammar checker.

Professional Write Plus, which is slated for release in two weeks, will be available to registered users of Professional Write and OfficeWriter for \$65.

Software Publishing Corp., 1901 Landings Drive, P.O. Box 7210, Mountain View, CA 94039-7210; (415) 962-8910.

## Roster of Rasterizers

## Adobe Type Manager

• Type I Postscript

• Bitstream FaceLift

• Speedo

## Zemographic's Superprint

• Type I Postscript

• Speedo

• Fontware (Bitstream)

• Interfont

(Agha/Compugraphic)

## Atech Software Publisher's Powerpack

• Fastfont

Various technologies underlie existing Windows font scalers, providing mixed capabilities.

## Microrim RBase 3.1 Gets DAI, Improved Speed, Extra Functions

BY SCOTT MACE

Hoping to peel away another layer of the dBase user base, Microrim last week showed a revised RBase capable of running any DOS application from within RBase.

RBase Upgrade Express 3.1A also provides four major speed improvements and almost a dozen new functions to RBase 3.1, which was released last October. Upgrade Express releases provide RBase users with new functions in a timely fashion, giving MIS departments predictable updates and a choice of upgrade frequency, Microrim officials said.

New Dynamic Application Integration (DAI) lets users suspend RBase operation, unload all but 15K of RBase, and run any DOS EXE program. When finished running another application, users can resume RBase operation at the point of exit.

Users can create and manage a menu of EXE files from within RBase using the Zip Return command. They can also sus-

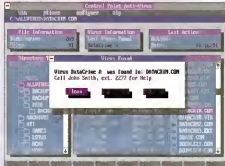
timize Application Express itself to allow nonprogrammers to create such menus, according to Microrim officials.

DAI is similar to products provided for X-Base, the family of dBase-like languages, in packages such as Fox Software's Foxbase and Dr. Switch from Black & White International, but may be more easy to use, according to Michael Masterson, founder of the Silicon Valley Data Language Group.

The speed improvements in Upgrade Express 3.1A include query engine optimization, report printing, conversion functions that reduce search time on text/data columns, and enhanced commands that increase productivity with less code. An Upgrade Express subscription, available directly from Microrim, costs \$129 per year and includes three upgrades. Until April 30, Microrim is offering an introductory price of \$99.

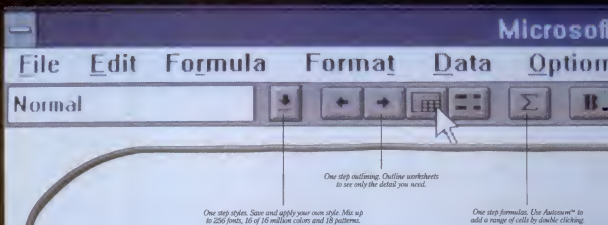
Microrim, 15395 S.E. 39th Place, Bellevue, WA 98007, (800) 248-2001 or (206) 649-9500.

## PRODUCT SPOTLIGHT



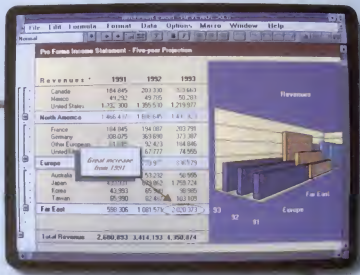
Central Point Software Inc. this week announced Anti-Virus 1.0, taking a direct shot at competitor Symantec's The Norton AntiVirus. Capable of detecting known and unknown viruses and popping up a customizable alert, the \$129 DOS-based Anti-Virus comes armed with the signatures of over 400 known viruses, which it can clean from a user's disk. Central Point's support plan includes quarterly updates of newly detected virus signatures. (503) 690-8090.

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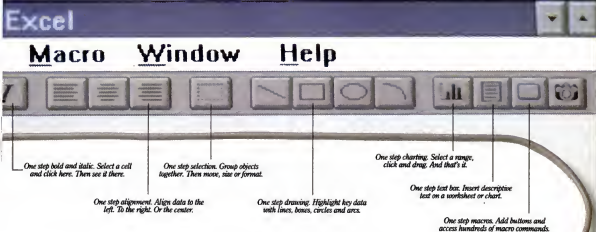
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## Qualitas' BlueMax 5.1 Lets Users Expand Memory on High-End PS/2s

Qualitas Inc. has delivered a version of its memory management software that lets DOS users with IBM's 486-based PS/2 Models 90 and 95 gain an additional 80 to 84K of high memory.

Unlike most memory managers, the latest version of BlueMax 5.1 can recover the additional memory by automatically compressing the ROM BIOS code not being used by DOS, company officials said.

The new version also gains memory by

loading device drivers, pop-up utilities, disk caches, and other kinds of resident software above DOS' 640K barrier.

BlueMax support for a particular system requires a specific BIOS Compression File (BCF) for that system's BIOS.

Registered users of BlueMax can download an update to the BCF for the 80486-based PS/2 from Qualitas' bulletin board by dialing (301) 907-8030; users who do not have modems can call

customer support for the update.

Compatible with Microsoft Corp.'s Windows 3.0, BlueMax 5.1 works with 80386SX- and 80386-based systems, as well as 80486-based machines and DOS 3.0 or later. The product is available now for a suggested retail price of \$155.

Qualitas Inc., Suite 1386, 7101 Wisconsin Ave., Bethesda, MD 20814; (301) 907-6700.

—Ed Scannell

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## SOFTWARE PIPELINE

### GRAPHICS

**LOTUS UPDATES DOS FREELANCE.** Lotus Development Corp. this week will announce an upgrade to its DOS-based graphics program, Freelance Graphics for DOS. Version 4.0 is slated to ship in the second quarter with an updated graphical WYSIWYG interface and support for on-screen color, a mouse, and BitStream fonts. It offers file compatibility with previous versions and continues to support visual data import. (817) 577-8500.

### SPREADSHEETS

**CA SLASHES SUPERCALC PRICES.** Last week, Computer Associates International Inc. cut the suggested list price for Supercalc3 from \$495 to \$149. This follows price cuts on the company's aCOPAC Bedford accounting software, to \$199 for both Macintosh and MS-DOS versions — down from \$349 and \$249, respectively. (800) CAL-CI-49.

### DEVELOPMENT TOOL

**MIND'S EYE OOP NOW SHIPPING.** Mind's Eye Inc. recently released its object-oriented program (OOP) that integrates project management, financial modeling, and graphics. The \$695 package, named Mind's Eye, can be used to develop single-user applications. It also features its own graphical user interface and can handle 2,500 objects. (800) 682-6746.

### TOOLKIT

**PC-10-WIZARD TOOLKIT.** Nicira Corp. recently announced a toolkit that enables users of the Sharp Wizard electronic organizer to create specialized databases on Integrated Circuit (IC) cards from their desktop PC. The toolkit facilitates development of databases for customer lists and expense files. The \$299 product includes communication software for data transfer between Wizard and PC, a connection cord, and a Sharp IC card with 64K of EPROM and 32K of RAM. (201) 947-2220.

### INTEGRATED SOFTWARE

**MICROSOFT SHIPS UPDATED OFFICE FOR WINDOWS.** Version 1.5 of Microsoft Office for Windows, which includes Excel 3.0, is now shipping. Introduced last October, Office for Windows bundles Word, Excel, and PowerPoint for a combined price of \$995 — separately, each program costs \$495. The update is priced at \$129 for users of Version 1.0 who purchased the package before December 7, 1990. Users who bought 1.0 after that date will receive the upgrade free. (206) 882-8080.

### MULTIUSER OS 2 SYSTEM

**CITRIX SHIPS OS/2 SYSTEM.** Citrix Systems is now shipping Citrix Multuser for OS/2, which supports multiple dumb or intelligent terminals connected to a single PC running OS/2. The package costs \$995 for a five-user license; an additional \$495 license allows you to double the number of users. A \$1,995 add-on license to the basic five-user package supports unlimited users. (303) 755-0959.

# Windows' Imaging Software Lets Users Customize Applications

By Ed Scannell

A fully featured image processing and analysis package from Data Translation Inc. touts a scripting option that lets technical users customize applications for Microsoft Corp.'s Windows 3.0.

Global Lab Image has advanced processing and analysis capabilities, including morphology, filters, histograms, and image acquisition—all of which are integrated into the environment.

Besides exchanging data with such applications as Microsoft Excel and Word, scientific users can cut and paste images and measurements with Windows 3.0's Clipboard.

The new program is useful for many scientific and industrial applications; for example, when counting and measuring objects such as tissue cells or defects in semiconductors. Once an image has been

"thresholded" according to gray scale, Global Lab Image automatically counts and measures all objects on-screen.

Data can be analyzed in the program's frequency domain, where a specific frequency or range of frequencies must be filtered out. In the frequency domain, users can carry out Fast Fourier Transforms (FTTs), inverse FTTs, and various spectrum-editing operations.

The scripting option allows less sophisticated users to record sequences of commands that can be saved to a file and replayed when needed. More advanced users can edit or write their own code.

Global Lab Image also supports image processing operations, from simple acquisitions to display and file input. Images can be acquired one by one or continuously. Those images can then be analyzed

with histograms and lines profiles.

The program supports Data Translation's frame-grabber boards for both IBM's PC AT and the PS/2 series.

Available April 15, the program's single-unit price is \$2,495; volume discounts are available.

Data Translation Inc., 100 Locke Drive, Marlboro, MA 01752-1192; (508) 481-3700.

## DynaComm/Elite. The most powerful 3270 Windows application.

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Multiple Document Interface support means your 3270 Windows application behaves just like your favorite Windows 3 spreadsheet or word processing application. Instead of running multiple instances of the application to support multiple sessions, DynaComm/Elite runs a single instance of the application using M.D.I.

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DynaComm/Elite's Keyboard Editor lets you remap 3270 functions for the keyboard, including smaller portable laptop layouts. With our Flashpad, you can change labels, colors and shapes of your

keys, use icons instead of keys and startscripts or script subroutines, in addition to autizing. More connectivity options.

DynaComm/Elite supports more adapters and data links than any other product in its category. It supports over 50 different Coax and SDLC

cards as well as 802.2, NetBIOS and IPX/SPX. All of your end users can get the same look and feel regardless of how they connect to the host.

For Windows-based LU6.2/APPC cooperative processing applications, look to future versions of DynaComm/Elite. Features will include APPC basic and mapped verbs, interactive learning and implementation facilities, high-level language interfaces and transaction program compatibility with IBM's OS/2 EE API.

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1-800-352-3270 FAX: 714-766-5049

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Data Translation's Global Lab Image integrates scientific analysis with image processing in a Windows environment.

## PowerSoft's QuickPix Builds Applications Merging Data, Images

Users lacking programming skills can use a new utility to build applications merging data and images. QuickPix from PowerSoft Inc. allows a photograph or other image to be displayed within another application via a memory-resident program.

The \$495 program, which began shipping in quantity last month, comes in two parts.

An authoring program creates links between image files and DOS applications. QuickPix, which uses standard PCX images, requires an image "trigger" to appear within the associated data record. The trigger, which can be any text string, relates the display to a particular image to be retrieved.

After the triggers have been configured, QuickPix uses a 20K TSR program to "watch" the screen for triggers, displaying the associated image when a trigger appears. The package includes a user license for up to five copies of the TSR viewing program, allowing users to distribute QuickPix applications.

The program supports resolutions from CGA to Super VGA, as well as color and gray-scale images. Users can also print images.

Besides DOS productivity applications, the program will also work inside a terminal emulation package.

PowerSoft Inc., P.O. Box 956338, Duluth, GA 30136; (404) 446-3185.

—David Courney

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## The Panasonic® 1124*i* is here.



The Panasonic KX-P1124 has probably won more awards than any other dot matrix 24-pin printer in history. The KX-P1124*i* represents a significant improvement.

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It's easier to load. With front, bottom and rear paper paths made even more convenient by a new and simpler tractor feed. Yet with all this enhanced power and flexibility, the 1124*i* is still one of the most attractively-priced printers around.

That, too, is the Panasonic way. And the reason why our strongest impression is value. For further information on the KX-P1124*i*, and the name of the dealer nearest you, call **1-800-742-8086**.

\* Based on US dollar market share of competitive models for the 12 months ending December, 1990, as reported by InfoCorp (1/91)

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## PROGRAMMING TOOLS

PROGRAMMING  
PIPELINE

## LANGUAGES

JENSEN INTRODUCES "MODULAR" TOOLS. Jensen & Partners International is shipping Version 3.0 of its TopSpeed Multi-Language Development System, which lets users couple its programming environment with any of four language modules. The system, which lets programmers work with more than one language simultaneously, supports coding for DOS, Windows, and OS/2. The company also rolled out new versions of its TopSpeed C++ and Pascal compilers. The environment costs \$99, and each compiler costs \$99, (415) 967-3200.

## CASE TOOLS

CASE-W CORPORATION EDITION SHIPS. Caseworks Inc. is shipping a version of its Case-W Windows development package specifically for corporate users. Case-W Corporate Edition adds support for secondary windows — including both child windows and Multiple Document Interface. It also offers CUI validation, context-sensitive help generation, and improved support for code regeneration. The package costs \$995; upgrades from the current Case-W product cost \$200. (404) 399-6236.

## DEBUGGERS

HARDWARE-ASSISTED DEBUGGER TO SHIP. Systems & Software Inc. will ship next month PCIntern, a hardware-assisted debugger for developers using Windows 3.0 or DOS extenders. The package features a Codeview-like interface with complex hardware breakpoints, timers, and triggers, and it provides a real-time execution audit trail. PCIntern, which includes both hardware and software, will have a list price of \$3,995. (714) 833-1700.

## DEVELOPMENT TOOLS

UPGRADED VALIDATION TOOL SHIPS. Codecheck 3.0, a development tool that analyzes source code, is shipping from Axtara Software Inc. Version 3.0 analyzes C and C++ code, and validates whether meets portability standards for DOS, OS/2, the Minitach, and several versions of Unix. The package now supports code written for Microsoft Corp., Borland International, Zortech Inc., Intertec, and Intel Corp. compilers. The package costs \$495 for DOS and the M68; \$695 for OS/2; and \$995 for Unix. (503) 244-5253.

Hyperkinetix's Builder 1.5  
Extends Batch Commands

BY MARK BROWNSTEIN

Hyperkinetix Inc. is shipping a software package that extends the DOS batch commands and that can be used to create compiled applications based on batch files.

Builder 1.5 lets users create effective menu scripts for networks and installation programs. In addition, the batch commands can be hidden from unauthorized users after they have been compiled into a COM or EXE program.

Further, the product includes commands that can be used to filter out unwanted keystrokes and to act on user input. Display boxes, colored text, and cursor positioning can also be controlled using Builder keywords.

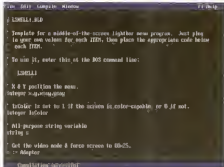
An interactive editor converts batch files into BLD files that are converted to object

code, and can be linked into COM or EXE programs. Both compiler and linker are included in Builder 1.5.

More than 140 keywords provide the capability to support mice — including light bar, pop-up, or pull-down — and to evaluate user input and system configuration. In addition, screen modification commands can be executed without loading ANSI.SYS.

Applications can be developed using Builder's interactive menu, which provides a multi-windowing development environment. Users who don't need the interactive interface may compile and link BLD files using simple commands.

Builder 1.5 lists for \$149.95. Hyperkinetix Inc., 666 Baker St., Suite 405, Costa Mesa, CA 92626; (800) 873-9993.



Builder 1.5 from Hyperkinetix lets programmers design menu scripts and installation programs.

## Cognos Debuts PowerCase for OS/2

BY ED SCANNELL

Cognos Inc. has announced an OS/2-compatible implementation of its computer-aided software engineering (CASE) tool that aids analysis and generates code for midrange systems from vendors such as IBM and Digital Equipment Corp.

PowerCase for OS/2 marks the first time a CASE tool has been fully integrated within a fourth-generation language (4GL) and ANSI-standard SQL relational databases.

Combining a 4GL with its application development environment, the new version lets corporate developers create applications faster and easier.

"CASE development is moving away from just stand-alone

offerings to being an integral component of application development tool sets," said Peter MacKinnon, director of CASE products. "And OS/2 makes sense because it delivers workstation-like functionality."

PowerCase for OS/2 has the capability to automatically generate on-line documentation as applications are written.

The program lets Presentation Manager display different views of the application simultaneously. These views can range from data flows to entity-relationship diagrams.

Available now, PowerCase for OS/2 costs \$15,000 for the initial license.

Cognos Inc., 67 S. Bedford St., Burlington, MA 01803-5164; (617) 229-6600.



Zinc Software is shipping a Windows version of its Zinc Interface Library, which will support Turbo C++ 2.0.

Slew of ISVs Ready to  
Support Turbo C++ 2.0

Class Libraries, More, to Ship Next Month

BY STUART J. JOHNSTON

In the wake of Borland's Turbo C++ 2.0 announcement, more than a dozen vendors have said they will provide class libraries and other products that support the package.

Borland's latest offering allows users to develop Windows applications in either C or C++ without purchasing Microsoft's Windows Software Developer's Kit. (See "Borland C++ 2.0 Shines at Software Development '91," February 18, Page 8.)

Zinc Software of Pleasant Grove, Utah, will ship next month two versions of its Zinc Interface Library 2.0 — one that supports DOS in text and graphics modes and another for Windows. (801) 785-8900.

The DOS-only package with source code will cost \$249 or \$199 without source code. The Windows product costs \$399 (with source code) and \$299 (without source code).

Blaise Computing Inc. of Berkeley, California, will also ship next month Win+++, a library of nearly 100 classes for writing Windows applications to the company said. Win+++, which includes source code, will cost \$249. (415) 540-5441.

Sturmer Haus Corp. of Stephenville, Texas, is shipping its \$450 Tier class library for Borland C++ 2.0, the company said. Tier features more than 100 classes for Windows development. (817) 965-2227.

Greenleaf Software of Dallas announced it will ship this month versions of its C++ class libraries that support the new Borland release. Prices range from \$199 for Financial Mathlib++ to \$359 for

Comlib. (800) 523-9830.

No-Mega Technologies of Nashua, New Hampshire, will ship Version 2.0 of both its \$249 Bruns-Checker and \$386 SoftICE debuggers in March, the company said. (603) 886-2386.

CNS Inc. of Minneapolis, Minnesota, is shipping C++ Views 1.1, a \$495 package that features an integrated Windows C++ development environment and more than 75 object classes. (612) 944-0170.

Xian Corp. of Ridgewood, New Jersey, said its WinPro3 Windows code prototypist and generator will support Turbo C++ 2.0. The package costs \$895. (201) 447-3270.

Creative Programming of Carrollton, Texas, will ship this month Version 4.0 of its Vita-Min C windowing-interface library for both DOS and OS/2. The DOS product, which works with Turbo C++ 2.0, costs \$395; the OS/2 version costs \$495. (214) 416-6447.

Raima Corp. of Bellevue, Washington, announced it is shipping a Turbo C++ 2.0-compatible version of its Ds-Vista III database development system. Purchasers of Turbo C++ 2.0 can buy a Developer's Edition of Ds-Vista for \$195 and later purchase an upgrade that lets them distribute finished applications, the company said. (206) 745-5570.

Other companies announcing support include XVT of Boulder, Colorado, (303) 443-4223; the Oakland Group of Cambridge, Massachusetts, (800) 233-3733; Microquill of Seattle, (800) 441-7822; Empathy Inc. of Cambridge, Massachusetts, (617) 787-3089; and Rogue Wave of Carlsbad, Oregon, (503) 745-5908.

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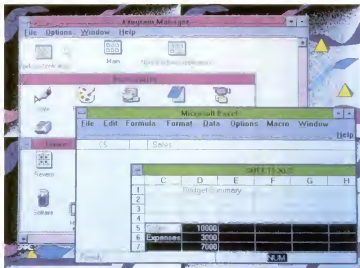
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# HARDWARE

## TECHNOLOGY TUTORIAL

### Drive Array Technology Too New for Standards Implementation Varies Between Vendors

By Mark Brownstein

Previous installments have discussed the theory behind RAID, and the various levels of RAID implementation.

Today's drive array architectures lack any clear standards. Although several vendors offer RAID Level Five, the means of implementing the arrays varies from manufacturer to manufacturer.

For large systems, HIPPI (high-performance parallel interface) has been proposed as an ANSI standard. Currently, HIPPI systems require dedicated drive controllers and can use ESDI or other high-performance hard disk drives.

A number of systems use proprietary hard drive controllers, and in some cases, specially developed hard drives. These systems, while providing high

performance and reliability, may lock the user into one vendor's RAID architecture. For example, only a drive available from the same vendor can be added to such a system, and often at a premium price.

Compaq Computer Corp.'s SystemPro uses a proprietary hardware approach to implementing its RAID technology. IBM and other vendors are also expected to use proprietary hardware to control their drive arrays.

A second approach relies on the relatively more standard SCSI host adapters. SCSI hard drives, and specialized software. This is the approach taken by 1776 Inc. of Los Angeles, Tenselectronics Corp. of Ashland, Massachusetts, Integra Technologies Inc. of Sharon, Massachusetts, and other developers.

MicroPolis Inc., which makes SCSI drives, is also work-

## Approaches to RAID

### Hardware:

- + Offers high performance and reliability.
- Use of proprietary controller and drive technology locks user into one vendor's offering.

### Software:

- + SCSI Implementation offers additional level of intelligence, faster performance, is non-proprietary, and potentially cheaper.
- As yet, no agreed upon SCSI standard, currently SCSI control limited to seven total devices.



Users have to decide between current hardware-based disk array solutions and SCSI-based software solutions coming soon.

ing on a SCSI implementation.

The software approach uses the SCSI adapter's capability to control as many as seven drives. Standard SCSI commands allow it to control concurrent write while reading and other operations. For example, on a system with four drives, performance is maximum performance.

In addition, the use of multiple host adapters provides further performance enhancements by reducing the latency of operations. For example, on a system with four drives, performance is better with two host adapters, each controlling two drives, than it would be using one host adapter to control all four drives.

SCSI adapters, however, are still not completely standardized, and special versions of SCSI software may be required for each flavor of SCSI host adapter.

In addition, all drives in an

array should be the same size to enable data and error-correction "stripping" across the array. "Stripping" involves putting parts of a file across the different drives in an array. If one drive fails, the data in the lost stripe can be recovered by examining the data on the other drives and error-correction code.

The approach to RAID implementation that is being developed by Micropolis places more intelligence on each drive's controller. In current implementations of RAID the CPU is required to manage the drives.

The Micropolis approach shifts the management burden onto each drive—error detection, correction, and negotiations between drives occur at the drive level. By moving the control off the CPU, higher system performance can be achieved, a company spokesman said. □

## Panasonic Ushers in Two 24-Pin Dot-Matrix Printers

By Tom Quinlan

Panasonic Communications and Systems Co. is continuing to focus on the oft-neglected dot-matrix printer market with the introduction of two new 24-pin printers aimed at both business and home users.

The \$499.95 KX-P1124i replaces Panasonic's original 1124 model and can produce draft, letter, and super letter quality at speeds of 300, 100 and 40 characters per second (cps), respectively.

Super letter quality mode enables the dot matrix printer to provide a character matrix of 48 dots by 30 dots, which is only

slightly less than the 300-by-300 dot-per-inch (dpi) resolution that's standard on laser printers, according to officials at the company.

The graphics resolution of the 1124i printer is 360 by 360 dpi. Other features of the 1124i include 11 built-in fonts, a liquid crystal display control panel, printer control commands in four foreign languages, and a 12K buffer, which can be expanded to 44K with an optional 32K buffer chip.

At \$399.95, Panasonic's KX-P1123 offers users draft and letter-quality modes at speeds of 240 cps on draft mode and 63 cps in letter-quality mode.

The printer also comes with seven resident fonts, five pitch settings and a 10K buffer, which can be expanded to 32K.

Panasonic Communications and Systems Co., Office Automation Group, 2 Panasonic Way, Secaucus, NJ 07094; (800) 742-8086.



Panasonic's 24-pin dot-matrix printer, the KX-P1123 comes with seven fonts at \$399.95.

## 16-Bit Graphics Board Supports Varieties of Display Resolutions

By Mark Brownstein

Personal Computer Graphics Corp. is shipping a graphics board that can produce a video signal at up to 75 MHz.

The Photon Ultima Turbo is a 16-bit video adapter designed to operate on all monitors running at 30- to 57-kHz frequencies.

In addition, the adapter is compatible with fixed scan-rate monitors operating at 31 1/2 kHz or 50 kHz, according to the company.

The Photon Ultima Turbo can display images at resolutions as great as 1,280 by 1,024 with as many as 16 colors in noninterlaced mode.

Other resolutions supported by the board include noninterlaced 256-color displays at 1,024-by-1,024, 1,024-by-768, or 640-by-800 pixel resolution. An interlaced display of 256 colors at 1,024 by 768 pixels is also supported.

The board is 100 percent

register-level compatible with VGA, EGA, and CGA, company officials said.

In addition, an external output connector allows simultaneous use of two monitors.

The 1,024-by-1,024 mode allows for display of a square image on a monitor capable of displaying 1,024-by-768 resolution.

The board comes with 1 megabyte of memory and includes display drivers for AutoCAD, Release 10 386 protected mode; AutoCAD, Release 11; Windows 3.0; and other popular graphics program. A display list processor built onto the board also provides high performance for AutoCAD users and supports fast bird's-eye view, zooms, and pans.

The Photon Ultima Turbo is priced at \$695 and comes with a five-year guarantee.

Personal Computer Graphics Corp., 5819 Uplander Way, Culver City, CA 90234; (213) 216-0055.

## Hitachi Releases Low-Emission VGA Color Monitor

By Tuseda A. Gragos

The Hitachi Group's Nessei Sanyo America Ltd. subsidiary recently released the 14MVM/LMF, a low magnetic field, 14-inch multiscanning color monitor for business graphics users.

The monitor is designed to comply with the most stringent electromagnetic emissions regulations for monitors in the office environment. The Swedish government mandates 1 milligauss magnetic strength or less at 20 inches from the screen.

Incorporating high-focus gun technology usually found in high-end CAD/CAM monitors, the 14MVM/LMF's image doesn't need adjusting. The monitor also has VGA resolution of 1,024 by 768, horizontal scanning frequencies between 30 and 40 kHz, and Mac II compatibility.

The monitor, which lists for \$995, also offers such ergonomic features as silica anti-glare treatment, a full tilt and swivel base, and front panel controls.

A number of companies have recently begun introducing low-emission monitors, although they stress there has been no proof that monitor radiation is a health hazard.

However, a number of American companies in Europe are currently considering adopting mandatory standards based on the Swedish emission standards, which are now only advisory.

The company also released the Info SGX and IGX graphics boards and software drivers for AutoCAD and Windows.

The boards are high-resolution, high-speed, intelligent graphic controllers.

They support DOS, Unix, and OS/2, and feature software-selectable resolutions as high as 1,600-by-1,800 dpi for the SGX, and 1,280-by-1,024 dpi for the IGX. The SGX and IGX boards are now available and cost \$4,295 and \$2,795, respectively.

Nissei Sanyo America Ltd., 800 South St., Waltham, MA 02154; (800) 441-4832.



Hitachi has introduced a low-emission graphics monitor, the 14-inch 14MVM/LMF for \$995.

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**Keyboard:** 101-key enhanced layout.

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**Storage:** 1.2MB, 5.25 inch, high density, double sided diskette drive. OR 1.44MB, 3.5 inch, high density, double sided diskette drive. 40MB IDE hard drive.

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**Memory:** 4MB memory expandable to 64MB of 64-bit memory.

**Storage:** 1.2MB, 5.25 inch, high density, double sided diskette drive. OR 1.44MB, 3.5 inch, high density, double sided diskette drive. 200MB IDE hard drive.

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**Memory:** 4MB memory standard; expandable to 64MB of 64-bit memory.

**Storage:** 1.2MB, 5.25 inch, high density, double sided diskette drive. AND 1.44MB, 3.5 inch, high density, double sided diskette drive. 200 MB IDE hard drive.

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# Commax, Dyna Mech Release 4-Pound Lightweight Notebook PCs

BY NICO KROMH

Two companies, Commax Technologies Inc. and Dyna Mech Electronics, recently introduced notebook-size computers that weigh only 4 pounds.

Commax believes its 386SX-based Ultrathin will appeal to the high end of the market, while Dyna Mech is aiming at the low end of the market with an 80C86-based machine.

Commax's Ultrathin will come with 1 megabyte of RAM, a 30-megabyte internal hard disk drive, and an external 3½-inch floppy disk drive.

It will also include a VGA-compatible, 640-by-480-pixel display that gives up to 32 shades of gray.

Ultrathin computers will include DR-DOS 5.0 in ROM, as well as external VGA and floppy disk ports, a parallel port, and a serial port.

A basic configuration, which includes

1 megabyte of RAM and a 30-megabyte hard disk drive will cost \$3,200. A 60-megabyte hard drive version weighs 2 ounces more, comes with 4 megabytes of RAM, and will cost \$3,800. Both are expected to ship this month.

Dyna Mech Electronics also recently began shipping a notebook-size computer. The DME-2086 is based on an 80C86 microprocessor, and like Commax's Ul-

trathin, it also weighs in at 4 pounds.

Intended to rival NEC's Ultralite, the DME-2086 costs \$995 and comes with a CGA-compatible display. It includes 1 megabyte of RAM, built-in DR-DOS 5.0, and a slot for Integrated Circuit memory cards that were designed to be compatible with PCMCIA standards. The cards come in a wide variety including 128K-, 256K-, 512K-, and 1-megabyte capacities.

External hard and floppy disk drives are also available for Dyna Mech's DME-2086, which runs on off-the-shelf AA batteries.

Commax Technologies Inc., 2031 Concourse Drive, San Jose, CA 95131; (408) 435-5000.

Dyna Mech Electronics, 123 E. 1850 N., Orem, Utah 84057; (801) 224-1261 ext. 414.

## Eastman Kodak Offers Quick-Transmitting 35MM Film Scanner

BY TUSADA A. GRADDS

Eastman Kodak Co. has announced a 35mm rapid film scanner that can capture a photographic-quality image and transmit it via modem, in less than five minutes.

The scanner, which can also provide optical cropping and advanced software tools, is designed for individuals and businesses that handle large numbers of photos.

The scanner uses the company's proprietary technology to capture a 1,312-by-1,024-pixel image for each of the three RGB primary colors, which results in files as large as 4 megabytes. Users see a lower resolution image on-screen, which is updated every second and can be edited or cropped before the final scan.

"Because cropping is done optically instead of electronically, the full resolution of the sensor is always applied to the image area being scanned," said Raymond H. DeMoulin, vice president and general manager of Kodak's professional photography division.

The scanned image file is designed to be transferred to an Apple Macintosh II computer where it will be compressed using an optional image-compression method. The entire process including capture, compression, transmission, and decompression takes less than five minutes, according to the company.

The machine stores as many as 32,000 characters of editable text, which could be a caption or other information, along with the image. A thumbnail image can also be stored, enabling the user to view a mini-version of the image without opening the file.

The 35mm film scanner is currently available through VARs. Kodak also has plans to distribute the machine through audiovisual dealers and professional photography suppliers.

The product carries a list price of \$8,495.

Eastman Kodak Co., 343 State St., Rochester, NY 14650-0519; (800) 445-6323.



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## TECH TALK ■ By STEVE GIBSON

# Portability of PC Applications Provides Fertile Soil for Viruses

The past two "Tech Talk" columns have explored some of the functional aspects of software viruses. Whatever their means or intent, these viruses are capable of spreading within an organization or community of

computers by riding along, whenever a program is uploaded, downloaded, borrowed, exchanged, shared, or demoed—even if it's only run once for 10 seconds.

I know how eagerly I explore new shareware or public-domain goodies that promise a benefit, and I've sold many copies of my own commercial programs

to people who admit to having first "borrowed" a copy from a friend to try out. Such software borrowing is today's reality, and I don't fight it.

The virus topic is controversial because many people feel that the press has overblown the whole affair. However, the mounting evidence demonstrates other-

wise, I'm aware of many private and public companies that have been hit hard by software viruses. No one wants to publicize that they've been infected by potentially troublesome software, so news of these outbreaks is often quickly and efficiently suppressed.

An example of a venerable software virus, the Retro Virus, will serve to demonstrate just how pernicious infectious software can be. The Retro Virus is capable of infecting any one of three popular commercial software programs in such a fashion as to remain completely hidden. By living inside the program's dead spots, Retro becomes very hard to spot. Whoever one of these three infected host programs executes, Retro gains brief control of the system, then time and date stamps a hidden part of the system with the fact that it was executed on this date. By monitoring the state of this date stamp, each of the separate Retro instances can monitor the last execution date of one of its "brothers," thus assuring that the virus' close counterparts are still active.

If the other components become dormant for any reason, the last surviving copy of the virus comes out of hiding to reinfect the other potential viral carriers. Thus the Retro Virus is extremely difficult to kill off; any small fragment is capable of "regrowth."

So what can be done to combat these diabolical software gremlins? Are preventive measures, inoculations, antidotes, and sugar cubes available? Yes. The first step is to take the problem seriously; you can't fight an enemy that you don't believe in. With all of the software that the average personal computer user is exposed to, it's easy to drop our guard from time to time and just run that one little public-domain program.

A terrific group of people in Santa Clara, California, who I have found over the years to be very accurate and reliable, have dedicated themselves to catching, analyzing, and disseminating helpful and specific information about software viruses. The Computer Virus Industry Association offers a 24-hour national BBS that can be reached at (408) 988-4004, or by voice at (408) 727-4559. The BBS contains a variety of extremely useful antiviral shareware that is kept up to date with the very latest knowledge of software viruses.

These programs rapidly scan local or remote network hard disks searching for the distinctive "fingerprints" of scores of prevalent and formerly prevalent viruses. Whenever we have a system that begins acting up and behaving mysteriously, and after first ruling out operator and other reasonably explainable errors, we download a recently updated copy of these antiviral utilities and run them against the suspicious system. Although we have over yet uncovered a virus in this fashion, I know of many people who have discovered the Jerusalem virus lurking on their systems in just this manner. This is certainly a case where an ounce of prevention is worth a pound of cured system data.

Steve Gibson is the developer and publisher of SpinRite and president of Gibson Research Corp. of Irvine, California. The views expressed are his own.

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# NETWORKING

## TECHNOLOGY TUTORIAL

### Vendors Seek Fax Modem Accord

TR-29.2 Class Standards May Slowly Eliminate Proprietary Solutions

BY DAVID COURSEY

One of the problems with fax modems has been the tight linkage between each vendor's own hardware and software.

With only one standard (Intel's Communicating Applications Specification) gaining limited acceptance, buying a fax modem usually means getting a proprietary device capable of running only the manufacturer's applications software.

The good news is those chains are being broken. The Electronic Industries Association's new standard, TR-29.2 Facsimile Digital Interfaces, will eventually outline three fax modem specifications.

Class 1, adopted last October, provides the minimal hardware support necessary to send a fax from a PC. "There are some things involved in sending a fax that simply cannot be done in software," said Toby Nixon of Hayes Microcomputer Systems. These include special modulation schemes used by Group III

fax machines and conversion from the PC's asynchronous data stream to the synchronous stream required for fax transmission.

A number of vendors, including Rockwell International, Intel Corp., and Yamaha Corp. of America are working on Class 1 chip sets for general release, sources said. The standard adds less than 10 new commands to the AT command set, Nixon said.

SoftKlone this week is announcing a new version of its Mirror software which uses technology from Thought Communications Inc. of Santa Clara, California, to support Class 1 devices. A number of hardware and software vendors are expected to follow suit, perhaps making Class 1 the standard Intel tried to create with CAS. There is some debate among vendors over performance claims for CAS versus Class 1, and some proprietary boards may offer higher performance as well.

Class 2 may end that debate, but many observers believe it

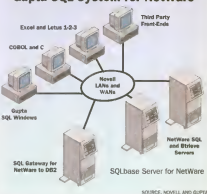
will not be finalized for a year or more. Class 2, which will add over 40 AT-command set instructions, puts more functionality into the modem, requiring less effort from the host CPU. That makes it more complex to implement, but solves some critical problems of the Class 1 technology.

Class 1 works best when the fax board can have full attention of the host CPU. This limits Class 1 devices to predominantly foreground tasks, while Class 2 modems will be better suited to multitasking or background use, Nixon said.

The performance differences aren't likely to be a major limiting factor for either class, according to Borden.

Class 3 is fairly speculative at this stage, but the general consensus is that such a device would be capable of on-board fax conversion, which is done on the host CPU in levels 1 and 2. But serious work on Class 3 has barely begun, with completion possibly several years away, Nixon said.

### Gupta SQL System for NetWare



SOURCE: NOVELL AND GUPTA

## Novell, Gupta Announce Joint Database Product

SQLWindows for Btrieve Tied With NetWare

BY SCOTT MACE

With the cloud of Novell Inc.'s aborted merger with Lotus Development Corp. a distant memory, Gupta Technologies Inc. and Novell cemented their relationship by announcing ties between their database products last week.

Gupta announced SQLWindows for Btrieve, Novell's key-indexed record manager, a product Gupta previewed in Novell's booth at Networkworld last month. SQLWindows is Gupta's application development system, which already allows creation of front ends for its SQLbase Server, IBM's DB2, and Oracle Corp.'s server.

Novell announced plans to develop an interface providing transparent access to NetWare SQL, its SQL database server, through SQLWindows.

Because Btrieve is bundled with every copy of Novell's NetWare operating system, purchasers of SQLWindows for Btrieve can build applications for the more than 300,000 NetWare LANs already installed, Gupta said.

Btrieve developers have traditionally created character-based front ends using languages such as C, Pascal, and Cobol. Gupta's announcement follows the disclosure last month that Borland International's Windows-based ObjectVision visual programming tool supports Btrieve.

SQLWindows for Btrieve is the first jointly developed product to be announced since Novell purchased an interest in

Gupta, a privately held company, in April 1990.

"With the availability of SQLWindows for Btrieve, application developers now have a new, simplified way to create or customize Windows-based client/server applications for the NetWare environment," said Nancy Woodward, vice president and general manager of Novell's Austin development center.

Gupta and Novell will jointly market SQLWindows for Btrieve. Both companies' sales and marketing personnel will be cross trained on the key technical highlights and features of SQLWindows and Btrieve. Technical support for SQLWindows for Btrieve will be provided by Gupta.

SQLWindows for Btrieve is available immediately from Gupta for \$1,595. It includes the standard SQLWindows Development Kit, five run-time versions of SQLWindows, and the Btrieve library.

The interface between SQLWindows and NetWare SQL will be available from Novell at no charge in the third quarter on NetWare, Novell's on-line information service. It will be included in the core NetWare SQL product in subsequent releases.

Still unreleased is Gupta's SQLbase Server as a NetWare Loadable Module (NLM), taking advantage of NetWare 386. Of all database server NLMs announced, only NetWare SQL is available today.

Gupta Technologies Inc., 1040 Marsh Road, Menlo Park, CA 94025, (415) 321-9500.

## Rapport Offers Document Control for Mixed Environment

BY YVONNE LEE

Clarity Software is beta testing a mixed-media, document creation and presentation application which it hopes will lure business users to Unix.

The product, called Rapport, includes word processing, a spreadsheet, graphics capabilities, presentation graphics, sound capability, and advanced electronic mail with fax support.

Clarity developed Rapport because it saw a void in the document creation tools available to Unix users, company officials said. "Unix workstations can't run the simple things," said Philip Whalen, vice president of sales. "You'll have someone with a \$20,000 machine with a \$5,000 machine alongside to do word processing."

The program's modularity and customizability lets users swap out portions of the program for applications they may already be using. Beta testers who chose Lotus 1-2-3 instead of Rapport's spreadsheet can call up 1-2-3 by selecting the spreadsheet icon from Rapport's menu.

Similarly, Rapport's X 500-compliant directory service can store profiles of other users, including those using other environments. Mac users with Word

and Excel as their main applications would receive Rapport documents in those file formats.

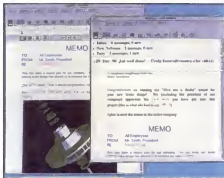
Rapport's E-mail has filters to automatically act on incoming mail. Mail from supervisors could be routed to an urgent folder; sales pitches could be automatically deleted; other messages, such as those with sales results, could trigger other programs.

Rapport runs over Motif on Hewlett-Packard, Digital Equipment, IBM, and Silicon Graphics machines. It runs under

Open Look on Sun workstations.

Rapport will convert a variety of PC, Mac, and Unix application files. Single-user converters are \$225 for the Mac and PC, and \$450 for the server. Unix converters are \$325 and \$650 for the single-user and server versions, respectively. All three converters are available for \$595 per single user and \$995 for a server version.

Clarity Software Inc., 2700 Garcia Ave., Mountain View, CA 94033, (415) 691-0320.



Rapport's E-mail features provide filters to automatically route mail from particular sources to the appropriate file.

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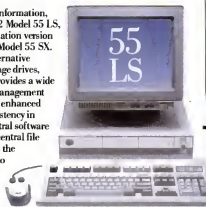
on your network's information, IBM offers the PS/2 Model 55 LS, a medialess LAN station version of the best-selling Model 55 SX. A cost-efficient alternative to models with storage drives, the Model 55 LS provides a wide array of effective management controls, including enhanced data security, consistency in software levels, central software maintenance and central file backup. Not only is the Model 55 LS easy to hook up (it comes standard with a Token-Ring Network or Ethernet adapter), but should you need to modify your system, it's easy to upgrade with diskette and file storage devices.

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# to advanced IBM leads the way.

performance, less memory requirements, fewer DASD requirements and support for Adobe Type Manager<sup>™</sup> fonts. And with support for 128 DOS requesters, LAN Server V. 1.3 can provide significant cost benefits for DOS network users. Compatibilities between IBM DOS LAN requester and the current version of Windows<sup>®</sup> 3.0 (LAN Manager 2.0 enhanced) have also been added, capping off the many ways IBM gives you greater flexibility in the LAN environment.

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For a great finish on any project, IBM offers a full range of printers for client stations, as well as the speedy, large-capacity IBM LaserPrinter, an efficient printing station with immensely attractive LAN benefits. With a high-duty cycle and fewer parts for fewer breakdowns, it offers extremely reliable printing while still boasting a 10-ppm printing speed. The optional paper bins allow for more efficient collation, so there's no need to visit and rearrange the printing station prior to the particular job. You can also easily and inexpensively upgrade to Adobe PostScript<sup>®</sup>. It all adds up to a range of complete, reliable printing solutions that can handle the kind of workload that any network, large or small, can generate.

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# Lifting FCC Requirement Makes Packet Radio Networks More Accessible

BY MARK STEPHENS

A recent change in FCC regulations on amateur radio licenses means it just got a lot easier to get into packet radio, the informal wireless data network that connects over 100,000 nodes nationwide.

Learning Morse Code, the bane of every kid who ever wanted an amateur radio license, is no longer required to earn

a Technician Class license. As of February 14, the Federal Communication Commission eliminated the requirement that license applicants demonstrate Morse Code ability. Applicants still have to pass a 55-question written test that emphasizes rules and regulations.

"The test is not difficult. It was the code requirement that kept people from getting into amateur radio," said Paul

Rinaldo, manager of technical development for the American Radio Relay League, the largest U.S. amateur radio organization.

Technician Class license holders can communicate on VHF and UHF frequencies above 30 MHz, which support transmission distances varying from line-of-sight to several hundred miles and data rates up to 9,600 bits per second, accord-

ing to Rinaldo.

Packet radio is a network of nearly 100,000 users and more than 10,000 repeating nodes that can transfer data across town or across the country using AX.25, an extended version of the X.25 packet network protocol, according to Phil Anderson, president of Kantronics, a manufacturer of packet radio equipment, based in Lawrence, Kansas. The existing nodes already provide nationwide coverage for the network, according to Anderson and others.

Packet radio requires a computer, a terminal node controller (TNC), and a radio transceiver. The cost of entry is not very high by computer standards, since TNCs start at just over \$100, and handheld transceivers are available for around \$300, according to Ryan Hansen, head of marketing and sales at Advanced Electronic Applications, another packet radio vendor, based in Lynnwood, Washington.

Just like telephone-based data networks, packet radio supports electronic mail, file transfer, and 976 registered packet bulletin boards, Anderson said. And once the equipment is in place, packet radio is free.

There is one drawback, however, at least under current FCC regulations. You can't use the network to take orders from customers or otherwise run your business, because packet radio is strictly amateur, a condition the FCC carefully enforces.

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Display	VGA, 640x480 CXTT	VGA, 640x480 LCD
	Passive White VGA LCD	86 grey shades support
	256Kb Video RAM	64 grey shades support
Keyboard	Standard AT compatible	Enhanced keyboard
	3mm key travel depth	2.5mm key travel depth
Memory	1 MB expandable to 5 MB	3 MB expandable to 5 MB
Software Incl.	Lotus 1-2-3	Not available
	Windows 3.0	
Support	Toll-free 800 number	Not available
	On-line modem support	
Price	30 MB - \$2399	30 MB - \$6499
	60 MB - \$4450	60 MB - \$8599

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## Wall Data to Roll Out Gateway, LAN-to-Host Connectivity Package

SAN JOSE, CA — Wall Data will announce today a LAN-to-host gateway and options for its Windows-based PC-to-host connectivity package that add support for mainframe graphics, AS/400 sessions, and customization capabilities.

The Rumba Gateway System, a Windows 3.0 application that manages LAN-to-host communications, supports SDLC and Token Ring SNA interfaces, and Netbios LANs. It supports several PC connectivity packages, including Wall Data's Rumba, Attachmate's Extra, DCA's IRMA, and IBM's Personal Communications/3270 software.

The gateway package, which is expected to ship this month, costs \$895.

Wall Data is also shipping an option for Rumba 3.1 that adds support for AS/400s, including 5250 terminal and printer emulation. The option costs \$100 in addition to the \$495 cost for Rumba.

The company also said it will be shipping Rumba Tools for the Administrator, four tool sets that let developers create customized Rumba applications that work with specific host applications.

Other tool sets provide customization using Windows' Dynamic Data Exchange, EHLLAPI, and Asymetrix's ToolBook. Each set costs \$195.

Wall Data is also shipping Rumba Graphics, a \$100 Rumba application that lets users access IBM mainframe graphics and integrate them into PC applications with cut-and-paste and editing tools.

Wall Data Inc., 17769 N.E. 78th Place, Redmond, WA 98052; (206) 883-4777.

— Stuart J. Johnston



## NETWORKING PIPELINE

### ■ MICRO-TO-MICRO

**FLOPPYWORKS LINKS NEXT WITH MACINTOSH.** Local Installation Technology Inc. is now shipping FloppyWorks, software that allows Next computers to exchange files with Apple Macintoshes and other microcomputers. Once installed on a Next, FloppyWorks can format, read, and write Mac floppies, as well as MS-DOS and OS/2 files. It also has file transfer utilities that allow users to translate data between word processing, graphics, database, and spreadsheet applications. The disk duplicator feature lets users make multiple copies of their floppy disks. FloppyWorks sells for \$250. (505) 662-1459.

### ■ NETWORK MANAGEMENT

**CABLETRON ADDS TO MONITORING PRODUCTS.** Cabletron has introduced the MacAView Network Analyzer which monitors Macs operating in an Ethernet or LocalTalk network. Features include performance statistics such as a breakdown of errors, and packet and byte counts; visible and audible alarms; traffic-generation capabilities; and analysis of filtered packets. MacAView sells for \$3,995. Cabletron has also released Version 2.0 of LANview Network Analyzer, which increases monitoring capabilities. Users can now monitor traffic, return statistics, and arm alarms for as many as 1,024 Ethernet addresses. Version 2.0 costs \$11,995. (603) 332-9400.

**ASC RELEASES NET EDMS 2.0.** Automation Software Consultants Inc. (ASC) is now shipping Net EDMS 2.0. A network-drawing database management system, Net EDMS 2.0 automatically assigns and enforces users' rights in library directories. It also supports dBase IV-compatible, user-defined project, drawing, and time databases. These databases can then be shared with other applications. Other improvements include enhanced plotter and printer management, and the addition of audit logs for tracking files and plotter activity. Site licenses are available for \$1,595; upgrades cost \$300. (800) 669-0842.

### ■ ADAPTERS

**GANDALF OFFERS NEW INTERFACE CARD.** Gandalf is now shipping its LANline/AT Ethernet network interface card. Used with IBM PCs and compatibles, the 10Base-T card sells for \$385. (800) 426-3253.

### ■ INTERNETWORKING

**CONNECTIVITY ACROSS TOKEN RING NETWORKS.** Sync Research has announced its SNA Network Access Controller for Token Ring (SNAC/TR). Each SNAC/TR can support as many as 16 communications lines, each of which can support either a direct controller connection or a medium supporting a multidrop network. Ports operate at speeds between 2,400 bits per second and 19.2 kilobits per second (kbps) with an option for a high-speed V.35 interface which supports speeds up to 72 kbps. The SNAC/TR is slated for second-quarter shipment and will cost from \$5,000 to about \$20,000, depending on the number of ports. (714) 588-2070.

## Two Macintosh Ethernet Adapters Continue With Conventional Methods

In spite of Apple Computer Inc.'s recently announced Ethernet cabling system, two companies have introduced Ethernet adapters for the Mac LC and SI that continue to combine the transceiver with the network adapter.

Asante Technologies Inc.'s MacCon+ LC card supports both thin coax and 10Base-T, allowing users to migrate to 10Base-T. It also has a floating-point unit socket for a math coprocessor.

The card is scheduled to ship February 28, with a suggested retail price of \$379. Dayna Communications Inc. is shipping cards for both the LC and SI. The DaynaPort E/LC is a thin Ethernet card (scheduled for next quarter) for the Mac LC, and the DaynaPort E/LC-T is for 10Base-T connection to the Mac LC. The DaynaPort E/SI is a processor direct slot card for the Mac II SI that does not require an additional adapter. The

DaynaPort E/SI-T has an on-board RJ45 connector for 10Base-T.

The 10Base-T cards cost \$399; \$549 with a math coprocessor installed. Asante Technologies Inc., 404 Tasman Drive, Sunnyvale, CA 94089; (408) 752-8388.

Dayna Communications Inc., 50 S. Main St., 5th Floor, Salt Lake City, UT 84144; (801) 531-0600.

— Yvonne Lee

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# MACINTOSH NEWS

## MACINTOSH PIPELINE

### PROGRAMMING

**NEW VERSION OF COMMON LISP FROM APPLE.** Macintosh Common Lisp 2.0 has been introduced by Apple Computer Inc. Among the new features included with the programming tool are support for the Common Lisp Object System, an interface Toolkit that enables users to graphically design application interfaces; and improved access to the Macintosh Toolbox. Common Lisp 2.0 requires a minimum of 2½ megabytes of RAM. Apple intends to start distributing a beta version of the software through its APDA developers program in late March, with a suggested price of \$495, (800) 282-2732.

### SOFTWARE

**ACUIS SHIPS 4D WRITE.** Acuis is now shipping a word processing module designed to work in conjunction with its 4th Dimension database product. The 4D Write program includes extensions to the 4th Dimension database language, enabling programmers to incorporate the word processing program into customized applications. 4D Write has a list price of \$295 and joins 4D Calc and 4D Graph as available modules for Acuis' 4th Dimension. (408) 252-4444.

**FASTER VERSION OF SWING SHIFT AVAILABLE.** Swing Shift 1.2, an employee time-scheduling software program, is now shipping from Computed Designs. The software is touted as being as much as 50 percent faster when compared to earlier versions, can track and schedule as many as 120 workers, and includes password protection — full names and access to desk accessories. Swing Shift 1.2 requires 2 megabytes of memory, a hard disk, and Hypercard, and has a list price of \$395. (818) 287-5495.

### SECURITY

**NEW PASS PROOF SECURITY FOR MAC.** Two new versions of Pass Proof for the Macintosh are expected to start shipping from Kensington Microare in the second quarter. The hardware and software combination includes a Pass Proof software disk, a Pass Proof lock, floppy disk, SCSI port, specially designed screws, and a customized screwdriver. The software provides password protection and screen locking features, and Kensington intends to provide versions — both priced at \$99.95 — for the Macintosh SE and Macintosh II lines. (800) 535-4242.



Oasis from Time Art is designed to give computer users the feel of painting on canvas, featuring a user-definable drying time.

## Time Art Offers Oasis Image Creation Program

BY LISA PICARILLE

Time Art Inc. is now shipping its Macintosh-based Oasis image creation program, allowing users to produce illustrations, graphics, and video images, the company said.

Oasis exploits Wacom Co. Ltd.'s pressure-sensitive stylus and tablet, which enables users to achieve the feel of painting by simulating the use of brush strokes on a canvas.

The \$795 program includes adjustable brushes with custom settings, allowing users to set attributes such as size, wetness, density, and dry-out speed of their strokes, according to Mike Shuster, an applications specialist for the company.

In addition, Oasis attempts to minimize the number of dia-

log boxes and on-screen menus, giving users the feel of real painting, according to Shuster.

The program also allows users to create images that can be incorporated into video. To ensure that the drawing's colors will be properly represented on video, Oasis includes an HLS color palette that locks out colors that can't be recorded or broadcast on video, Shuster said.

Oasis supports RasterOps Corp.'s ColorBoard 364 video display card and Truevision Inc.'s NuVista and NuVista Plus videographics cards, which enable users to capture images for video.

Time Arts Inc., 1425 Corporate Center Parkway, Santa Rosa, CA 95407; (707) 576-7722.

## GCC Technologies Introduces Its Personal Laser Printer II

BY TOM KUNISAN

In apparent response to the expected introduction of a low-cost laser printer from Apple, GCC Technologies has started selling a \$999 laser printer and cut the prices of some of its other existing laser printer products as well.

The \$999 Personal Laser Printer II features 4 page-per-minute (ppm) print speed and comes configured with six out-line fonts from BitStream, which enables the user to reduce or enlarge text from 25 percent to 400 percent.

GCC originally introduced the product at a price of \$1,399 last year.

At the same time, GCC

reduced the cost of its 8-ppm Quickdraw-compatible laser printer, the BLP II, to \$1,999, down from \$2,399. The BLP II comes with 11 font families.

GCC's low-cost strategy is based at least partially on the large number of Macintosh Classic and LC buyers predicted this year, with First Boston estimating Apple will sell 735,000 Classics and 650,000 LCs in 1991.

GCC Technologies Inc., 580 Winter St., Waltham, MA 02154; (617) 890-0880.

### TECHNOLOGY UPDATE

## Color Matching Is Not All Black and White

Existing Solutions Are Somewhat Limited

BY KRISTI COALE

The dawn of desktop publishing on the Macintosh gave users the notion that what they saw on the computer screen was what they would see in printed output.

However, the state of the art of the Macintosh at this time was the Plus and the LaserWriter, and Mac publishers lived in a black-and-white world.

With the state of the art in Macintosh publishing now encompassing color, things have become a little more convoluted, to say the least. Even for experienced individuals, working in color is a hit-and-miss operation as colors appear differently from one display to another, and from display to printer.

Such hit-and-miss activities include adjusting the monitor colors to fit one set of printed output, or adjusting the ink weights for printing to match the monitor and such. But working to achieve color matching is largely experimental, according to Jonathan Seybold, publisher of the Seybold Report on Desktop Publishing.

**ELIMINATING THE GUESSEWORK.** Because of the guesswork involved, several vendors including Radius, Supercard, Adobe Systems, Tektronix and Electronics For Imaging (EFI) have developed products to give users a fighting chance at color matching, a means of generating output with the same colors as displayed on-screen.

In spite of the promise of some of these products, these vendors see the limit of their individual efforts. "You could call ours incomplete," said Amit Mazumdar, product marketing manager for Radius, which offers a color calibration system for monitors. "Ours is more for monitor drift."

Color matching involves the conversion of color spaces, from RGB (red, green, blue) on the monitor to CMYK (cyan, magenta, yellow, black) on the printer. But within color, there is a discrepancy over what to include in this process of matching as publishers often deal with spot and process color.

Spot color refers to single-colored images that are not usually photographic-quality color. Process color encompasses the broad world of visible color such as color photographs. Pantone Inc., largely known for its system of spot colors, also offers a set of process colors.

**INTEGRATING PANTONE INTO THE COLOR-MATCHING SCHEME.** Some vendors working on color-matching solutions, most notably Radius and Supercard, have turned to the Pantone system for color products. Radius, which licensed Pantone's color system, developed for Pantone the Professional Color Toolkit, a library of color look-up tables and device-description tables.

Recently, Pantone announced that this toolkit will support its Process Color System and will be an open system, allowing for support of future developments such as the anticipated proposal from the recently formed Association of Color Developers (ACD) for a color-matching applications programming interface (API).

But Pantone is seen by other developers as a side show to the issue of color matching. "Pantone is a small step in this process, but it is limited," said Efi Arad, president of EFI. He cited Kodak's YCC color space model as ideal for color matching and device-independent color, which is the next step beyond matching that affords similar output between monitor and printer, independent of the type of printer or monitor. □

## The Case for Device-Independent Color


### Why Device-Independent Color Is Important

System ensures color on monitor (RGB) matches that of output (CMYK), either when outputting to low-end proofing device or high-end image setter.

### Variables Affecting Color Matching

- Complications in converting 256<sup>3</sup> colors from RGB space to CMYK
- Ink color can vary from device to device depending on age of ink, etc.

Several barriers still exist for publishers trying to match colors between their monitors and printers.



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**GLOWING REVIEWS** *PC Magazine* said it best in giving Fastback Plus its prestigious 1989 Editor's Choice Award: "Fastback Plus has virtually everything a backup program needs: top-speed performance, clear menus, every imaginable option, even a built-in macro program for automating complex tasks. A superb achievement."

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## STATE OF THE INDUSTRY • BY RACHEL PARKER



prepublicizes the merits of using Windows today and moving to OS/2 3.0 later. Last month, InfoWorld's Ed Scannell

## IBM's OS/2 2.0 Needs Strong Marketing to Face Competition

IBM has a difficult task ahead of it: To convince buyers to consider OS/2 2.0 while Microsoft

discovered that IBM had released OS/2 2.0 to beta sites. Though IBM has declined to comment on the product, which although well known has not been formally announced by IBM, beta testers say that OS/2 2.0 is in pretty good shape. This release is just about on schedule and suggests that IBM should be capable of

meeting its earlier pledge to ship the operating system later this year.

But the significant issue now is not code quality, but a new IBM attitude. In addition to testing the software on its PS/2s, IBM has asked its beta testers to test OS/2 2.0 on non-IBM equipment.

In this age of multivendor networks

and "interoperability," such a request may seem mundane. But for IBM to recognize that customers may have non-IBM equipment represents once again that Big Blue realizes it no longer controls the computer marketplace.

The philosophical shift, however, won't be enough to sell copies of OS/2 2.0 to the companies currently looking at all the operating system options. If IBM wants to seriously challenge Microsoft's vision — in which Windows APIs are supported directly in OS/2 3.0 — then it is going to have to rally its own significant marketing forces.

Microsoft is actively discussing its upgrade path for Windows. The company holds almost-weekly briefings with dealers, ISVs, or the press, and at most of these discussions the Windows-to-OS/2 3.0 path is at least mentioned. As it nears completion on Windows 3.1, even more talk about networking support is certain to be heard from the Redmond company.

Now look at IBM. The company has not outlined a path for OS/2 since the September briefings describing the new relationship with Microsoft. OS/2 2.0 has gone through several stages of completion, including a beta release, without much fanfare at all.

IBM will continue to lose the positioning and mindshare battles unless it starts some aggressive publicity to promote OS/2 2.0 . . . soon. Right now, the software could provide complete multitasking, a wonderful graphic user interface, connections up and down the line from PC Jrs to mainframes, and take out the garbage, but no one would know.

IBM's silence must be part of a policy to not promote products before they are released. We applaud that policy; in fact, many a column here has been devoted to criticizing the industry's tendency to over promote products long before their time. In this case, however, it may mean that OS/2 2.0 is losing its chance to ever get off the ground as Microsoft in the meantime continues its publicity offensive for Windows and OS/2 3.0.

Microsoft has also done what IBM has often failed to do: listen to customers and create a development path around those needs. In fact, the whole OS/2 migration plan from the start was IBM's effort to move what had become a very unwieldy market.

Having beta testers run OS/2 2.0 on other systems won't solve these problems for IBM, but it is a start. The company will have to convince buyers that 2.0 is not a proprietary operating system, and that its capabilities are worth the investment now, rather than waiting for 3.0. All of this, however, takes marketing savvy, something IBM has not been strong in lately.

Without recommending that Big Blue simply indulge in its own round of vaporware and ambitious claims, it will have to do something to make OS/2 2.0 stand up to Microsoft's vision. The operating system could be technically superior to all that has come before or after, but without support from a strong marketing machine, it will simply flounder.

Rachel Parker is InfoWorld's executive editor of news. Comments are welcome via MCI Mail (I.D. number 340-4371, or InfoWorld) or through traditional mail.

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## TECH STREET ■ BY JOHN GANTZ



## Wholesale Clubs Offer Alternative for Price-Conscious Buyer

I came across the newest personal computer distribution channel quite by accident. A friend of mine, whose company supplies him with his work PC, was in the market for his home PC. Based on the demands of his job, he needed something with some beef — but his company's policy would not foot the bill for the PCs that employees took home.

Then began a search befitting my friend's Yankee heritage — a quest for value at the lowest price.

After ruling out name brands at well-known computer retail chains (too expensive) and used computers (too risky), my friend started investigating mail order. Then he found out about wholesale membership clubs.

These are those organizations that run warehouses and showrooms for the exclusive use of card-carrying members who pay modest annual dues for the privilege. More exclusive than warehouse stores or odd-lot discounters, they act a little like a military PX for civilians. In 1983, wholesale clubs, or warehouse clubs as they are sometimes called, accounted for only \$1 billion of total U.S. retail distribution, according to analysts at Salomon Bros. By 1990 that share was up to \$2.2 billion.

In the PC venue, Positive Corp. (of Chatsworth, CA) claims to be spearheading the development of wholesale clubs as a distribution channel for PCs. While wholesale clubs have sold PCs before, typically they were underconfigured and underserviced, inappropriate for serious business computing. Positive's philosophy has been to remedy that. Its PC Positive 486/33 features 64K cache memory, 200-megabyte hard drive, Super VGA monitor, Microsoft Windows 3.01, DOS 4.01, Excel and Word, along with some other software for \$1,999.

Founded in 1985, Positive has proven the wholesale club distribution concept at least to the tune of \$20 million in 1990 revenues and expectations of 1991 revenues of \$40 million. The clubs that Positive distributes through include Sam's (a Wal-Mart subsidiary), the Price Club, and the Wholesale Club.

Positive, by the way, is not the only vendor to use wholesale clubs as a primary distribution channel. Others include Emerson, Cordata, KIH, and Packard Bell. Some manufacturers even use liquidator catalogs as a primary means of distribution.

While Positive's two years of operating history is not enough to prove that 486s and high-end 386s have truly become commodities, the fact that the company exists at all is significant. For small businesses and individuals, wholesale clubs offer a lower price alternative to the big computer retail chains. Wholesale clubs, for instance, once the primary distribution channel for fax machines, according to Positive, are now volume PC buyers, wholesale clubs offer both a role model for internal distribution of PCs and a potential second source for PCs themselves.

John Gantz is editor of Tech Street Journal, which covers the high-tech stock market and business performance. The views expressed are his own.

The role-model aspect comes in the energy wholesale-club suppliers put into determining best-selling configurations. Positive has a drop-ship system for club members ordering custom configuration and tracks these orders for insight into popular features and configurations. These, in turn, become the future pre-

packaged systems.

For computer retail and mail-order chains, the emergence of a new low-price commodity channel only means that there will be no letup in pressure on margins.

Not everyone will buy a PC through this offbeat channel, but I suspect more

will. Networks, no, but the things that hang on the networks — like PCs and printers — yes. As mail order was once a roughish and risky way to buy a computer — but is respectable today — buying through low-overhead operations such as wholesale clubs may develop similarly. Don't dismiss the channel.

# Before You Blow \$500 On Lotus 1-2-3, Excel Or Quattro Pro, Read This.

**CA Shocks Spreadsheet  
World With 70% Price Cut:  
Highly-Rated SuperCalc5  
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CAMBRIDGE, Mass. — Early today Computer Associates announced a dramatic price reduction on one of the industry's most popular and best-selling spreadsheet programs, SuperCalc5.

Effective immediately, the suggested retail list price for SuperCalc5 has been slashed from \$495.00 to \$149.00. This for SuperCalc5 — which is Lotus 1-2-3 compatible — will only be under \$100.00. This bold, new pricing strategy is in great news for spreadsheet users. It means now everyone can afford to trade up to the technology in the industry. And unlike Lotus 1-2-3.0 or Excel 3.1, SuperCalc5 is a true 3-D spreadsheet.

"We've always listened closely to what users want and they've been concerned with high spreadsheet prices and the expensive hardware upgrades which are often required," said a CA spokesman. "Users told us that they wanted the latest spreadsheet technology, but they needed it at a price they could afford and in one application that would run on all of their PCs. That is exactly what we're giving them. SuperCalc5 at this new low price is by far the best value in the spreadsheet industry."

Initial reaction amongst spreadsheet users and software dealers has been overwhelming. "This is terrific," said one user. "It's about a 70% price cut."

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More than 3,000,000 copies have been sold and unlike some others, SuperCalc5 runs on virtually every type of PC that exists.

If you've been thinking about moving up to a more powerful, full-featured spreadsheet, now's the time. Move up to SuperCalc5 and get everything you've always wanted for hundreds of dollars less than Lotus 1-2-3, Excel or Quattro Pro. For the name of your nearest SuperCalc5 dealer call 1-800-CALC-149.

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Digest 486/25i, Sep. 18, 1990

Magazine 486/25i, Sep. 18, 1990

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## PERSPECTIVES

# The Power of the Pen

*In a high-stakes field, pen-based systems may be the next industry tug-of-war*

BY LAURIE FLYNN



is on the horizon.

But whether this emerging technology will gain wide acceptance or be relegated to the status of a niche product is still a matter of debate. What is certain is a small but technologically impressive start-up will face an uphill battle, voluntarily pitting itself against the might of an industry giant.

And depending on who you talk to, the stakes are either high or very high. If newcomer Go Corp. is right, the pen-based technology could reel in millions of new computer users, people who today carry legal pads and clipboards as they travel from gas meter to gas meter, or customer to customer. To these so-called "mobile workers," it is assumed that using a pen to operate programs and input data into a personal computer — a computer that looks nothing like the ones they fear today — will feel as natural as filling out a form with a standard No. 2 pencil.

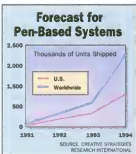
And in the war for the hearts and minds of these potential customers, not to mention millions of PC owners, the battle lines are quickly being drawn. On the one side, Go is promoting its vision: To be truly intuitive, the pen must be the heart of the system ("the pen is the point," goes the company motto), and its PenPoint

**P**en-based technology could reel in millions of new computer users.

operating system is its "from scratch" answer, Microsoft Corp., on the other hand, chides the newcomer for expecting PC users to tolerate two operating systems — one for their desktop PCs and another for their portables — and to ignore their investment in Windows applications. Hence, Pen Windows, a set of extensions to Windows 3.1.

"Go is a little off base to say you need a new operating environment because of a pen," said Jeff Raikes, Microsoft's vice president of office systems, applications division.

"It's not necessarily clear that the world is out there demanding a new 32-bit operating system," Raikes said.



U.S. shipments of pen-based systems will grow from 43,000 in 1991 to about a million in 1994. Internationally, sales will be over twice that in three years.

**THE PEN VS. THE SWORD.** There are two points of view: Go either has a huge development head start — a final developer version of PenPoint was released last month, whereas Microsoft's developer kit is only in beta form — or it is 3 million Windows users behind.

Clouding the issue further is the question of hardware support. Despite Go's lead in terms of the readiness of its operating system, Microsoft announced last week it has attracted support for Pen Windows from 21 hardware developers, including five of the Big Six in the laptop computer industry: Toshiba Corp., Sharp Corp., NEC Corp., Seiko-Epson Corp., and Grid Systems Corp. (Grid already offers a system based on MS-DOS.) Only three hardware developers have announced support for Go's PenPoint — but Big Blue is among them. Fujitsu, NCR, Hitachi, Samsung, Canon, Sanyo, and Wang are among Microsoft's other supporters. Grid and NCR have announced support for both platforms.

Though IBM is mum on the subject of Pen Windows, some observers feel IBM may be forced to support it. "IBM is going to be driven to Microsoft by customer demand, but I think they will be just as supportive of Go," said Tim Bajarin, vice president of Creative Strategies Research International, a Santa Clara, California, market research and consulting company.

Whether IBM supports one or both products could determine the sway of the market. Bill Cornfield, president of the New York-based Windows Support Group, contends that the only thing that could make the Go system interesting to his Windows customers is the existence of an IBM machine supporting it, but he's skeptical that IBM will actually produce one.

**ONE OR BOTH?** As with virtually every other new PC technology, the key is software developers: Will they take the plunge, investing millions of dollars and thousands of hours of labor in an all-new operating system or be scared off? And there are still question marks around other systems developers, primarily Apple. According to Jeffrey Tarter, editor and publisher of the *Softletter* industry newsletter, and others, Apple will probably take an approach similar to Microsoft, adding the pen as an option.

Twenty-one software developers and six companies that design networking hardware and software have licensed Go's PenPoint; among them is Slate Corp. with its Pen Apps application development system. Only a handful of software developers have publicly announced support for Pen Windows, but these include, for example, Contact Software International and De Vinci Systems Inc.

Like most major players, Scotts Valley, California-based Borland International Inc. will hedge its bets, according to Spencer Leyton, Borland vice president of business development. Borland has publicly committed to developing programs for both PenPoint and Pen Windows; most other large developers are likely to do the same. However, smaller developers will probably have to choose between them.

"The majority of soft-

ware companies are under \$10 million," said Bajarin. "They've got limited resources so they can't afford to do both."

But even with the support of software companies, Go faces enormous challenges before its software can succeed in the market. To get there, this new technology must cross light-years of MIS momentum, challenge the prevailing metaphors of desktop computing, and convince corporate programmers to basically start over in another operating environment. And, of course, there's "The Microsoft Muscle Factor."

"If someone said they were developing a telephonic operating system, Microsoft would announce [it's] been working on it for four years," Leyton said. "Microsoft thinks operating environments are its birthright."

"If the market is going to be driven by technology, Go has the edge," Bajarin said. "But if it's going to be driven by business, Microsoft will have the lead. Corporate clients are going to demand standardization."

As good as PenPoint is — even the most jaded technology junkies are thrilled by it — a technological edge may not be enough for companies with substantial



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## Windows investments.

Although Microsoft has the benefit of thousands of Windows applications that could, at least theoretically, be controlled by pen gestures without modification, many observers contend that truly elegant Pen Windows applications will have to be written from scratch. At least some modification is required to optimize them for Pen Windows.

Plus, argues Go chairman and co-founder Jerrold Kaplan, lacking the capabilities onto Windows will only add confusion to the installed base. "Adding a pen onto an already complex system makes it more complex," said Kaplan. "Unmodified Windows applications are unlikely to get the benefit from the addition of a pen."

The willingness of companies to commit to two operating systems — one for the desktop and one for its more "mobile" employees — is a major issue for debate. Go and its proponents contend that users aren't concerned about the underlying technology as long as they can transfer data easily between the two environments. Multiple platforms, they say, is a corporate reality.

"People are willing to just share data and are not so concerned about operating environments," said William Lempeis, editor and publisher of *Pen Vision News*, a newsletter published by Pleasanton, California-based IBIS Enterprises.

Microsoft, of course, contests this argument. "There's a lot to it [data exchange across platforms]," said Microsoft's Raikes. "If it were that easy I'd sell a lot more word processors."

And, there are plenty of people for whom data exchange isn't enough, Raikes said. "Sure, you can have two different applications and have training and support for two different operating environments," he said. "There are a lot of people who don't want to do that."

The idea of supporting multiple operating systems doesn't phase State Farm Insurance, however. It has been evaluating a prototype of the PenPoint system since the fall of 1989 and was instrumental in the strategic planning of Go and IBM. As a result, IBM has committed to developing a machine for the system.

"Before we started working with [PenPoint], we had reservations, but there seem to be a lot of valid reasons for rethinking the operating environment," said Nancy Bicket, manager of applications systems for the Bloomington, Illinois-based insurance giant. "We felt that it was good to rethink applications when they are put on this kind of platform,

rather than porting them from a desktop, because you really do have to think about this new interface to get the most benefit." State Farm also prefers the notebook interface for pen applications, Bicket said.

**A MOBILE TARGET.** Mobile workers are just part of the picture. The market for pen-based software is divided into three segments, according to Bajaran. First, standard desktop computers equipped with graphics tablets, including the 1.8 million already in use by graphic artists

doesn't want to say 'Hi, we're another operating system,' at the risk that both users and developers would cringe at the very idea."

"What you want to do when you start out is have a very defined target," said Bill Campbell, president of Go, and a former Apple executive. "You purposely underestimate [the market]. The company is initially targeting 'mobile workers' because of PenPoint's 'recognizable utility' for that market, Campbell said.

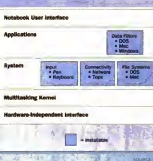
But all the marketing aside, Go and Microsoft are for the most part going after

Besides the pen technology itself, application developers will also take time getting it right. "Look back at how it took us to get good Mac tools, good Windows tools," Tarter said. "Software is created in two rounds."

Others think it will even longer. "It [pen technology] is not going to be a major factor for four or five years," said Bill Cornfield, president of the Windows Support Group.

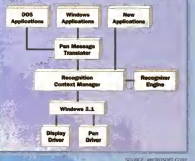
**IT'S ALL IN THE GESTURE.** One of the biggest myths of today's pen technology is that

## Penpoint Object-Oriented Operating System



PenPoint's object-oriented architecture is divided into five layers, including a pre-emptive multitasking kernel. The system layer includes an input and handwriting translation engine with replaceable elements.

## Pen Windows Architecture



An extension to Windows 3.1, Microsoft's Pen Windows includes a recognition content manager and recognizer engine. It will be compatible with Windows applications but will also encourage the development of new, pen-specific programs.

and other professionals, are potentially a huge market, though not a very elegant use of the technology. Next are traditional, though next-generation, laptop and notebook-type portable computers with keyboards attached. One key feature of these machines will be the capability to detach the pen-sensitive screen from the rest of the system.

But the largest potential market, and that for which Go's technology was specifically designed, is the so-called "clipboard" market, high-performance portable systems with integrated writing screens. This is the technology that will attract "mobile workers" such as State Farm's insurance estimators, sales professionals, delivery workers, and those in similar occupations.

Go's initial description of its product as being for a specific class of users is not a new technique, though which model it's using varies with the observer.

"They're taking the Next approach: We'll tell them we're an educational computer and we'll surprise them by being a business computer," Borland's Leyton said. "[Next] didn't want to say 'Hi, we're another computer vendor.' In the same way, Go



notebook-PC-toting salesman, Microsoft chairman Bill Gates has described in his traveling "Information at your Fingertips" presentation.

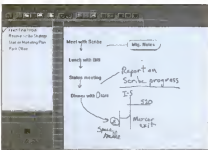
"By and large they're going after the same markets," said Lempeis. "It's going to become a lot more horizontal than people think. A lot of that will depend on price."

How fast it gets into the hands of consumers will indeed depend on how fast the price of dedicated pen-based systems comes down to the \$1,500 to \$2,000 range. Initially, machines will be at least twice that, ranging to as much as \$6,000. (See sidebar, Page 49)

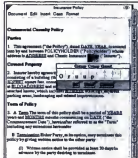
**BEWARE THE REVOLUTION.** What worries some observers, even some of pen technology's greatest enthusiasts, is that the roughness and inaccuracy of early pen systems will scare off the very computer neophytes it is intended to entice. Tarter compared to the 128K Mac. "It's safe to predict, we think, that pen-based computing will have to endure as much as five years of choppy evolution and corporate shakeouts before it reaches its full potential as a serious platform," Tarter said, in the February 4 issue of *Software*. "And that kind of slow progress is bound to irritate a lot of customers and investors who like quick results."

the immediate goal is handwriting recognition. Although the capability to recognize handwritten text is clearly the direction things will ultimately take, in Kaplan's view the more elegant PenPoint applications will — at least initially — be those that require little handwriting recognition at all.

In fact, the quality of some PenPoint applications will be judged on how well they eliminate free-form writing, said Go's Campbell. Instead they will use a form or similar layout to minimize the actual recognition. Kaplan estimates that as much as half the PenPoint applications that eventually appear won't use any handwriting recognition at all, depending primarily on the recognition of basic



Pen Windows includes a personal information "applet" that uses a notebook user interface metaphor.



PenPoint includes a word-proofing feature allowing the input of corrected text.



## gestures.

"People are not going to use pen-based machines for large volume data entry," concedes Kaplan. "But all that much handwriting goes on." Clearly, the pen is a complete replacement for the keyboard is still a long way off.

**MORE THAN JUST THE PEN.** Despite being the new kid on the block, Go has had the advantage of learning from everybody else's mistakes. Because of this, Go has come up with an operating system that many observers and potential customers feel beats Microsoft's at its own game.

ProPoint uses a 32-bit flat-memory model, supports pre-emptive multitasking, and is fully object-oriented. But its most impressive features, say many experts, are its capability to automatically configure networks and to store data transfer commands, and its single imaging model for screens and printing. It also offers the capability to create live compound documents to allow users to embed one document in another, regardless of the application either was created in (similar to Microsoft's Object Linking and Embedding technology).

Another obvious — but significant — difference is Go's choice of a notebook metaphor, rather than the oow standard desktop metaphor, which people such as State Farm's Bicket and many others consider more natural for pen applications. (To address this issue, however, Microsoft plans to include notebook application of its own in the form of what Raikes calls an "applet.")

**GENETIC ENGINEERING?** Overall, the race between Pen Windows and ProPoint will not be unlike other competitions that Microsoft has engaged in. It always comes down to the same thing: fear of not being so Microsoft's team.

Despite the odds, Go's executives say they are ready. "I think [Microsoft] should take notice, and they have," Go's Kupalo said. "[They] represent both an opportunity and a force."

No matter what happens, both companies recognize the competition will do them good. "Our strong points will push them," Raikes said, and that's good for customers.

"The user always ends up benefiting," said Borland's Leyton. "We always end up with a more robust gene pool." □

— Nico Krohn contributed to this story.



Go chairman and cofounder Jerrold... on pen capabilities... complex.

## Pen Systems Will Be Fun, But They Won't Be Cheap

What's it going to cost to buy a pen-based system? Plenty, at least initially.

Estimates range between \$3,000 and \$6,000 for a dedicated pen-based machine. NCR, for example, plans to sell a 386SX machine for pen-based computing for about \$5,000.

Until prices come down to under \$2,000, most of the systems will be purchased for mobile workers such as

sales and service professionals. By 1993 system prices will start to fall by about \$1,000 a year, thereby making the systems more attractive to horizontal markets, according to Tim Bajarina, vice president of Creative Strategies Research International, a market research company in Santa Clara, California. Bajarina predicts that in late 1992 a major chip and BIOS manufacturer will release an

off-the-shelf system to OEMs in order to create pen-based systems, hence bringing the cost of those systems down. Overall, however, pen-based computing won't be a stable platform for about five years, according to *Software* editor Jeffrey Tarter and others.

Desktop users can buy graphics tablets as add-ons for about \$1,500.

— Laurie Flynn



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## FROM THE EDITOR

### 'Next-Generation' Windows Faces Obstacles

While a 32-bit version of Windows and OS/2 3.0 grabbed most of the headlines coming out of the recent Microsoft Strategy Seminar, the most interesting long-term announcement involved the future OS that Microsoft referred to as Windows: The Next Generation.

Some of the elements of this next-generation operating environment seem fairly straightforward, such as an external macro language. But other parts are much more ambitious.

Compound documents would let users assemble files using various individual tools. For instance, you might use a text-editing tool (or word processor) to create text and a table-editing tool (or spreadsheet) to create a table. Both programs would act on the same document.

Such an operating system would require an object-oriented file system, because rather than having separate files, users would have lots of little objects created in various tools. Their files would contain pointers to those objects.

To keep these pointers up to date, the operating system would have to create many indexes of the data on mass storage devices. The system would have to intelligently keep track of the links between various objects, because a user might not want to delete or change a spreadsheet that itself is part of a table in someone else's word processing table.

This would let you more easily find information, but you would have to use the operating system shell itself as a querying tool. Thus, it would need to function like an application, not like today's program and file managers.

Such a system could have many advantages. For instance, instead of having drawing tools included in a charting package, spreadsheet,

and a word processor, a user could instead have one drawing tool that he could use in all these kinds of applications. And he'd be able to choose whichever tool was most appropriate to the task. This could improve productivity and cut down on training.

But it would also raise all sorts of questions. To begin with, this significantly blurs the lines between operating systems and applications. How do developers sell individual tools, such as a drawing tool described above? Would it be sold as part of one of the main applications, as part of the operating environment, or both? How are users going to make sure all these tools work together? Will average users be able to set up this system or will it require a lot more knowledge about the tools and the operating system?

In one scenario, it might make sense to include all the major tools with the operating system, but that would create an essentially closed environment — such as the old VisiOn system. One doubts that customers would want or accept this.

If the tools are sold by individual developers, all developers would be forced to work together much more closely than they ever have before. How easy will it be for competitors to work together in that fashion?

None of these are questions that can or will be answered quickly. Indeed, although Microsoft referred to this as "Windows: The Next Generation," it's probably five to 10 years away. Instead, you'll probably see a lot of iterations to the existing operating systems — perhaps a Windows 4 and a Windows 5 — that slowly integrate some of these features.

— Michael Miller

## TO THE EDITOR

### Windows is a Resource Drain

Now that the Windows hype is over, let's review what actually happened. When Windows 3.0 came out, hundreds of thousands of people upgraded from Windows 2.X and a million or so copies filled the retail pipeline. Even today, my local software store has a small mountain of unsold, heavily discounted Windows software. A million or so copies were sold to corporations and the government, again at a substantial discount, in some cases bundled with hardware.

We now realize that Windows is only being used by people who previously used products that are available in Windows. A few have even changed back because they find the graphical interface confusing or too sluggish. Corporations are discovering that it is harder to document, teach, and automate Windows procedures.

The cost of developing for Windows is prohibitive. Those who promote Windows are not interested in the most effective use of resources, they are interested in the computer as a video game — and even there Windows has small value.

Susan Temple

### OS/2's Printing Speed

Several articles have been published describing the improvements that appear in OS/2 1.3. One issue that I haven't seen presented is that of printing speed, an area where OS/2 1.3 exhibits dramatic improvements.

After recently receiving our copy of OS/2 1.3, we performed a test comparing the printing speed between OS/2 1.2, OS/2 1.3, and Windows 3.0. The test consisted of printing identical text and graphics files from IBM PS/2 to a Hewlett-Packard Co. LaserJet II (using Microsoft Word for Presentation Manager on OS/2 1.2 and 1.3, and using Microsoft Word for Windows on Windows 3.0). The results were rather startling. Under OS/2 1.3, the documents printed 3.73 times faster than under OS/2 1.2, and 3.87 times faster than under Windows 3.0.

It appears that IBM is on the right track with OS/2, and despite the recent smoke screen from Microsoft, OS/2 is becoming a much more usable and desirable environment.

Thomas Kent  
Sunnyvale, CA

### Corrections

In the February 18 issue, we identified a 24-hour support hotline as Novell's ("Novell Unveils 24-Hour Hotline," Page 34). The company offering the hotline is called US-Network, and it is a division of NSSI, a Novell reseller in New York City.

In "Linker Ships for DOS, Windows, OS/2," February 18, Page 16, the phone number is incorrect: 518 Systems Inc. (Page 34). The (412) 283-0864. In our February 25 story "Windows' Growth Spawns User Groups, Newsletters" (Page S11), we incorrectly stated information regarding the newsletter *AC Knowledge*. The *Window Letter*. The correct telephone number is (201) 543-2273; yearly subscriptions cost \$245, not \$195.

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## FUTURE TENSE ■ BY PAUL SAFFO



## First 'Information War' Will Affect the Computing Business

When war came on January 17, there was little doubt that computers had fundamentally redefined the calculus of conflict. Our television displays the video *memento mori* of smart weapons homing in on targets with eerie precision, and nightly tracings of Patriots rising to meet Scuds were often replayed.

Surprisingly, few PCs were noticeable in the images shown on the evening news. Reporters seeking a personal computing angle to the Gulf war saw little outside of battle-hardened laptops on command-center tables. This is a microprocessor-rich but PC-scarce conflict, and the scarcity hints at important trends for business in the peace to come.

The Gulf war is not a computer war, but something more exotic. And the computers that matter are invisible. It is an information war in which munitions ride data streams into battle, and horrendously expensive weapons are made horrendously effective by disposable computing power. One cruise missile packs more computer power than existed in the entire military prior to 1960.

But the real difference doesn't reside in warheads. This is a war permeated by C&C — computers and communications — a complex, interconnected electronic infrastructure that keeps the vast resources assembled in Saudi Arabia from griddocking to a standstill. PCs are hard to spot because they are fundamentally stand-alone devices. Their place is taken by C&C tools embedded in military hardware, and by more powerful workstations acting as windows into C&C networks.

C&C is also the acronym for "command and control," which is Pentagon-speak for the central task that C&C systems are meant to support. The same task is referred to as "management" in the business world, which has repeatedly taken lessons from the military. The structure of the first corporations was inspired by that of the German army around the turn of the century, and World War II amounted to a graduate program in logistics for postwar multinationals. This time around, we will learn about global-scale C&C from the Pentagon.

Of course, the Pentagon is also learning on the job, and this adds a whole new dimension of uncertainty to the already uncertain fortunes of war. Will smart munitions finally deliver on the decades-old promise of victory through air power, or will ground troops discover that the bombing was for naught? C&C has already allowed the coalition forces to strike with unprecedented intensity and violence, but can it provide the finely tuned command and control essential to the conduct of the military's novel Air/Land battle doctrine? The ground invasion is underway as these words are written, so answers are likely to come sooner than later.

But C&C is certain to serve up yet more surprises, even after the smoke of battle clears. Executives will discover that

implementing C&C in their companies will require profound organizational changes. This will lead to the likely invention of entirely new kinds of corporate structures in a decade or so.

On the military front, the '90s are likely to be a decade of infatuation with the microprocessor and other familiars of

the computer revolution. Current systems have performed impressively, but the computers at their hearts often are quaint relics compared to what can be had in PCs today. The temptation to build complex new devices and infrastructures will be too great to resist. This can already be seen in the enthusiasm that Patriot

successes have generated for the revival of "Star Wars" research.

Finally, the pivotal role of C&C in the Persian Gulf will not pass unnoticed elsewhere on the globe. Having invented the information war, we are certain to see even stranger and more deadly conflicts in the years that lie ahead.

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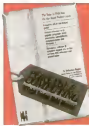
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# PRODUCT COMPARISON

## Getting Your Wings

*InfoWorld tests 8 powerful 386SX notebooks that make great traveling partners.*



BY ROB CHAPIN AND PATRICK LYONS TEST CENTER  
INTRODUCTION BY SEBASTIAN RUPLEY ASSOCIATE REVIEWS EDITOR



High-end notebook computers are so hot now that demand for them outweighs supply. Even such powerhouse system vendors as Compaq Computer Corp. have been unable to ship higher end notebook systems at a pace that keeps up with demand (See "Few Compaq LTE 386/20s in Channel; Market Lead Over IBM, AST Threatened," January 14, Page 1). And even though every hardware

company from Kennelbunkport to Tokyo seems to be jumping into the notebook manufacturing race, some very big players in the portable computer arena are, surprisingly, not yet competitors in the 386SX notebook market. These vendors include IBM Corp., Toshiba, and NEC. The speedy and powerful 386SX-based systems that made it into this product comparison all arrived for testing at the last minute, and by the time this comparison appears, we expect several more 386SX systems to be added to this fast-growing market.

In our last comparison of notebook systems (March 19, 1990, Page 55), which we usually define as weighing under 8 pounds, we found a lot of significant differences between the lower end systems we tested. For instance, last time we were unable to successfully run several of the software applications in our test suite with those less-powerful products. Also, workmanship and displays varied.

This time around, things were different. Except for some minor configuration changes we made via setup routines, these 386SX notebooks flawlessly ran a software application suite that included Microsoft Windows 3.0 (which ran speedily on all the systems), Desqview, dBase, and Paradox; these frequently present compatibility problems even with more powerful desktop systems.

If you are going to run high-end software applications on these systems, you'll also be pleasantly surprised to find that most of these notebooks offer substantial RAM

expandability — up to 10 megabytes for the Compaq, for example. They also come with optional 2,400-bit-per-second modems, and the Twinhead system even comes with an optional pocket LAN adapter. In fact, we weren't able to trip up these systems at much of anything. The major differences between them turned out to be price — with a high of \$6,499 for the Compaq and a low of \$2,295 for the Zeos — speed, and battery life. (Remember that street prices on many of these systems are dramatically lower.)

One scoring area where there was some interesting variation was support policies. Some companies offer outstanding and unusual support policies, such as Zeos' 24-hour technical phone support and Everex's 48-hour repair policy. If you're looking to purchase a fleet of notebook computers, such policies may play a major role in your buying decision.

As far as important day-to-day use issues go, we were favorably impressed with the designs and displays that these systems offered. We found none of the murky LCDs, flimsy workmanship, and merely passable designs that were typical of notebooks only a year ago. The keyboards, too, were all at least adequate, although quirky keyboard layout seems to remain a problem; we didn't rate any of the keyboards we looked at higher than satisfactory.

Here they are — affordable computers that can do it all, and that you can throw in your briefcase when you're through.

### Products Reviewed

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Altima NSX.....	Page 62
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## BENCHMARKS

INFO  
WORLD

## 386SX Notebook Computers

	ALR Venture 16-386SX	Aitima NSX	Compaq LTE 386S/20	Everex Tempo LX	Samsung NoteMaster SX	Texas Instruments Travelmate 3000	Twinshead Supersite SX	Zenith Notebook 386
Clock speed	18 MHz	16 MHz	20 MHz	18 MHz	16 MHz	20 MHz	16 MHz	18 MHz
Battery life	2:33:10	1:20:54	<b>3:03:44</b>	2:36:48	3:19:51	1:32:25	2:21:53	2:36:48
System RAM	1MB	2MB	3MB	1MB	1MB	2MB	2MB	1MB
<b>Speed scores</b>								
CPU-intensive speed	0:08:06	0:08:04	<b>0:05:19</b>	0:07:44	0:07:51	0:06:41	0:08:31	0:07:45
Disk-intensive speed	1:16:44	1:19:52	<b>0:52:44</b>	1:19:04	1:18:31	1:03:19	1:28:37	1:19:31
dBase III Plus	0:37:42	0:40:07	<b>0:28:15</b>	0:38:33	0:38:24	0:32:07	0:42:48	0:38:48
dBase IV 1.1	0:20:59	0:21:56	<b>0:14:21</b>	0:21:21	0:22:14	0:17:29	0:23:20	0:21:24
Lotus 1-2-3 2.2	0:05:57	0:05:56	<b>0:03:52</b>	0:05:37	0:05:45	0:04:57	0:06:16	0:05:37
WordPerfect 5.5	0:02:09	0:02:08	<b>0:01:27</b>	0:02:07	0:02:06	0:01:44	0:02:15	0:02:08
Paradox	0:18:03	0:17:49	<b>0:12:06</b>	0:19:10	0:17:53	0:13:43	0:19:29	0:19:19

All times in hours:minutes:seconds. Fastest times are in bold.

## REPORT CARD

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## 386SX Notebook Computers



	(InfoWorld weighting)	(Your weighting)	ALR Venture 16-386SX	Aitima NSX	Compaq LTE 386S/20	Everex Tempo LX	Samsung NoteMaster SX	Texas Instruments Travelmate 3000	Twinshead Supersite SX	Zenith Notebook 386
<b>List price</b>			\$2,795	\$3,499	\$6,499	\$2,999	\$3,999	\$5,499	\$3,495	\$2,295
<b>Performance</b>										
Speed: CPU-intensive	(100)	( )	Good	Good	Excellent	Very Good	Very Good	Excellent	Satisfactory	Very Good
Speed: Disk-intensive	(100)	( )	Good	Good	Excellent	Good	Good	Very Good	Satisfactory	Good
Software compatibility	(50)	( )	Good	Excellent	Excellent	Excellent	Good	Excellent	Excellent	Excellent
Size/weight	(75)	( )	Good	Poor	Good	Good	Good	Very Good	Very Good	Good
Battery life	(75)	( )	Good	Satisfactory	Good	Good	Good	Satisfactory	Good	Good
Capacity	(100)	( )	Very Good	Excellent	Excellent	Good	Very Good	Good	Good	Good
Screen readability	(75)	( )	Satisfactory	Satisfactory	Good	Good	Good	Good	Good	Satisfactory
Keyboard	(50)	( )	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory
<b>Documentation</b>	(50)	( )	Good	Satisfactory	Excellent	Very Good	Good	Very Good	Good	Satisfactory
<b>Ease of use</b>	(50)	( )	Good	Good	Very Good	Good	Good	Very Good	Good	Satisfactory
<b>Serviceability</b>										
System design	(50)	( )	Good	Satisfactory	Very Good	Very Good	Satisfactory	Good	Good	Very Good
Support policies	(50)	( )	Good	Very Good	Satisfactory	Very Good	Very Good	Very Good	Good	Excellent
Technical support	(25)	( )	Satisfactory	Very Good	Very Good	Satisfactory	Satisfactory	Satisfactory	Very Good	Satisfactory
<b>Value</b>	(150)	( )	Very Good	Satisfactory	Good	Very Good	Good	Good	Satisfactory	Excellent
<b>Final scores</b>			<b>6.3</b>	<b>6.0</b>	<b>7.7</b>	<b>6.8</b>	<b>6.4</b>	<b>7.0</b>	<b>6.0</b>	<b>7.0</b>

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**Poor** = 0.25 — Falls short in essential areas.  
**Unacceptable** or **N/A** = 0.0 — Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

Products receive InfoWorld's Buyer's Assurance seals if they meet the following conditions: The vendors offer 60-day money-back guarantees on the products, and the products also receive no scores lower than satisfactory in our Report Card. Vendors who qualify have signed contracts with InfoWorld that detail these support policies. InfoWorld awards the Recommended seal to products that, in addition to the above criteria, receive a Report Card score of 8.0 or higher.



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## Executive Summary

It's tough to dramatically knock any system in this comparison. Less than two years ago you were on the cutting edge of technology if you had a desktop system configured along the lines of the notebooks in this comparison. These notebook computers include power comparable to that found in desktop PCs but their size requires relatively few design and performance compromises. There were, however, some clear leaders in the categories we examined.

The Compaq LTE 386SX/20, which we looked at before, is a superior product that represents the state of the art in notebooks. As you would expect with its 20-MHz clock — but all but one of the other systems have 16-MHz clocks — the Compaq is still the fastest system we've tested by a considerable margin. It's also an extremely well-designed system with top documentation, although it's expensive.

The Zen Notebooks 386, with its sleek black design and impressive CPU-intensive speeds, is also an outstanding competitor. Aside from being by far the least expensive system in this comparison, this notebook is backed by a number of unexpected extras in the area of support policies, including a 30-day money-back guarantee and 24-hour telephone technical support.

With its new Travelmate 3000, Texas Instruments has made a vast improvement on the old Travelmate notebook. As is the Compaq, this system is powered by a 20-MHz clock, and it's a snappy performer with the second fastest times we found.

The Everex Tempo LX isn't the most expandable system, but it has a nice-looking display and high-quality documentation, and it is backed by impressive support policies, including a 48-hour turnaround for repairs.

ALR's Venture 16-386SX is a low-price system that was a midrange performer on most of our tests without falling down in any significant way.

The Samsung NoteMaster SX, from a company known chiefly for its monitors, was a surprise. It did well on our tests, especially CPU-intensive speed timing and battery life — where it was the leader. It is a relatively costly system.

The Twinhead Supermodel SX was the slowest performer in both our CPU-intensive and disk-intensive speed tests. We did, however, run Windows 3.0 and several other high-end applications on it without trouble. Overall, this system was an average performer.

The Altima NSX is a somewhat quirky notebook that is hindered by a weight of about 10 pounds — it may make it by definition more of a laptop system. Nevertheless, the company is marketing it as a notebook and it stood up fairly well in our tests. This machine does have a larger-than-normal keyboard, which could be an advantage for some users. The price could be lower, but this is a very expendable system.

# Testing and Scoring 386SX Notebook Computers



## 386SX NOTEBOOK COMPUTERS

Until recently, notebook computers included substantial design compromises — especially in the areas of displays and keyboards. As is our practice, we conducted in-house "taste tests" in order to score these crucial issues. No machine seemed to be less than adequate.

Size and weight, as it turns out, are not as crucial with notebook computers as they once were. Only one of the systems in this comparison weighs more than the 8-pound ceiling we have imposed on notebooks (we have included it because it is sold as a notebook), and most of the others weigh within a pound of each other and are thoroughly portable.

The scoring category that included the most surprises in this comparison was capacity. If you still think a notebook with 640K of RAM and a 20-megabyte hard disk is state of the art, think again. Several of the systems compared here can be equipped with 60-megabyte hard disks, and one can be souped up with 10 megabytes of RAM. The capacity ceilings these systems offered were effective enough that we were able to run all our high-end software applications on each of these systems — an impressive feat if you consider that our test suite includes Windows 3.0, Desqview, and dBase tests. These are powerful computers, not miniature novelties.

Scoring criteria for this comparison are based on responses to a survey of more than 1,000 InfoWorld readers. You can adjust weightings found in our report card to reflect the importance you apply to categories we score.

### PERFORMANCE:

Performance is divided into eight categories: CPU-intensive speed, disk-intensive speed, software compatibility, size and weight, battery life, capacity, screen readability, and keyboard.

Speed: As with desktop computers, InfoWorld's speed scores for notebooks test performance for CPU-intensive applications and disk-intensive applications. Our CPU-intensive scores are based on the times of a test suite that executes a series of typical business routines in Lotus 1-2-3 2.2 and WordPerfect, Version 5.1. The disk-intensive scores are based on test times of applications run in dBase III Plus, Version 1.1; dBase IV; and Paradox 386.

For a more detailed explanation of the speed tests, see the "How We Tested" section of one of our desktop computer

product comparisons (such as our comparison of 486/33 systems, November 12, 1990, Page 89). Some of the software tests and file sizes are different in this test plan.

All the systems we tested had adequate speeds, but we awarded scores relative to the specific times each system clocked. It should be noted that we could not obtain systems with exactly the same RAM configurations for this comparison, and many of them cannot be configured with comparable RAM at all.

Software compatibility: To test software compatibility, we ran the following programs: Desqview, Windows 3.0, Sidekick Plus, Microsoft Word 5.0, Crosstalk, Lotus 1-2-3 2.2, and Lotus 1-2-3 3.1. Machines that ran all components of our software test suite earned an excellent score. We dropped the score one grade for each program that wouldn't run without requiring reconfiguration.

Size/weight: We routinely define notebook computers as being under 8 pounds, but with higher end systems coming out, this ceiling is a bit more flexible. All systems were weighed with their batteries, and for systems that weighed under 8 pounds, we automatically awarded a score of satisfactory. For systems under 7 pounds, we awarded a score of very good. No system weighed under 6 pounds in this comparison, which is the line of demarcation for a score of excellent.

Battery life: To simulate moderately heavy use, our battery test program writes a 317K file and pauses for 5 minutes (to simulate "thought" time). This series is repeated, but at every fifth cycle an additional 220K file is written (to simulate occasionally loading a new program or overlay). This process is repeated until the computer halts operation.

During this test any screen-dimming mechanism is disabled, but other power-saving features remain in the default state.

Systems that run for at least 6 hours earn an excellent score. Products that run for at least 4 hours score very good. Over 2 hours rates a good score. At least 1½ hours is required for satisfactory. Less than three-quarters of an hour scores unsatisfactory.

Capacity: Capacity scores started at

satisfactory for any machine that offered a 20-megabyte hard disk and at least 1 megabyte of RAM standard. Additional hard disk capacity options were worthy of one full scoring boost (satisfactory to good, good to very good, etc.). For every 2 megabytes of RAM available above the baseline of 1 megabyte, we boosted scores a half a point.

Screen readability: Screen readability was judged by a panel composed of several Test Center technicians and reviewers. Issues include the display's overall look under ambient lighting, ranging in effect from bright light to dim airplane, as adjusted by any available brightness and contrast controls; adjustability for viewing from angles; how cursor size and blink rate affect the ability to find it on a full screen of text; bleeding (whether the clear areas above and below columns of characters show up darker than the other clear areas of the screen); thickness and shape of characters; ability to distinguish between different colors through use of different contrast or brightness levels or different character thicknesses.

Most of the notebook systems we compare offer VGA resolutions of 640 by 480 with at least 16 shades of gray. All the displays were found adequate, and scores awarded by taste-test participants were averaged to obtain the final scores.

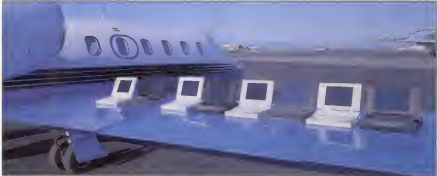
Keyboard: Our panel evaluated such issues as reasonably positive keystroke (i.e., you can tell by feel when the keystroke has registered, though perhaps not with total accuracy), audible keystroke, and no widely improbable key positions compared to a standard desktop keyboard (AT standard or AT enhanced).

We noted separate cursor keys and separate numeric keypads. Keyboard scores are averages of scores awarded by in-house taste-test participants.

### OTHER SCORES

Scores for documentation, ease of use, system design, support policies, technical support, and value were awarded according to our usual criteria. See the "How We Tested" section of our previous comparison on notebook computers (March 19, 1990, Page 55) for details.

This product comparison was developed by Rod Chapin and Patrick Lyons, Test Center Technicians; Gregory S. Smith, Test Development Specialist; and Sebastian Rupley, Associate Reviews Editor.



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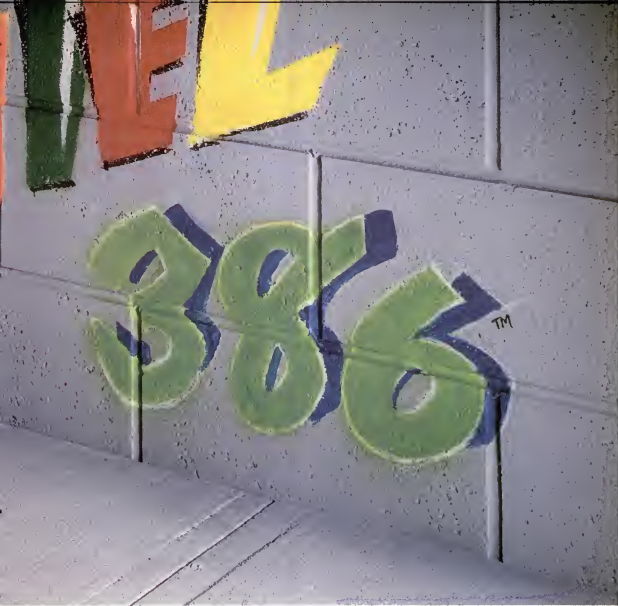
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## ALR Venture 16-386SX



**A**LR's Venture 16-386SX is the company's first foray into portable computers, and they've done a remarkable job. ALR has pulled several of the best features found in other notebooks together and combined them into one well-designed system.

The Venture has a clamshell design, and its keyboard is a bit larger than those found on many other systems, with substantial key travel. The screen display is readable though smaller than the displays of other systems. The Venture comes with either a 20- or a 40-megabyte drive, 1 megabyte of system RAM, and was the only system in our comparison that shipped with Digital Research's DR-DOS 3.0 instead of MS-DOS.

The Venture's CPU-intensive speed score was slower than several others.  
**Score: Good.**

The 16-MHz ALR fared well in disk-intensive tests. It was beaten only by the two 20-MHz systems in this comparison.  
**Score: Good.**

The Venture ran all of our software but we had slight problems with Lotus 1-2-3 3.1 and Windows 3.0. We had 1 megabyte of RAM in our machine, and these programs required all of it in order to run. **Score: Good.**

The ALR is relatively heavy at 7 pounds, 12 ounces but not as heavy as the Altima system. The Venture's size — 12½ inches by 8.6 inches by 2.1 inches — is smaller than several other systems, such as the Zeos and Everex systems.  
**Score: Good.**

See ALR, Page 67

## Altima NSX



**A**ltima's NSX notebook is the largest machine of all the systems we tested, and may even qualify as more of a laptop system than a notebook. The NSX weighs about 10 pounds, and it really could use a handle.

This system runs at 8 or 16 MHz and comes with 2 megabytes of RAM standard, expandable to 8 megabytes. The Altima includes a standard 20-megabyte hard drive (a 60-megabyte hard drive is an option), and it has an almost full-size 83-key keyboard. Expandability options are quite impressive with this system, but its weight and size are drawbacks.

The Altima's times in this category were slower than some others. **Score: Good.**

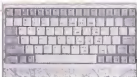
The NSX was one of the slowest performers. **Score: Good.**

The Altima performed without errors when running our software test suite. **Score: Excellent.**

The NSX weighs about 10 pounds with its battery, which is quite a bit heavier than what is commonly thought of as a notebook weight. For many notebook users, 10 pounds may be too much, but we tested this system as a notebook because it is sold as one. **Score: Poor.**

See Altima, Page 67

## Compaq LTE 386S/20



**T**he Compaq LTE 386S/20 is one of the hardest hitters in the notebook ballpark. We found this system to be the fastest in this comparison (though it must be kept in mind that this system has a 20-MHz clock, and most of the others have 16-MHz clocks).

The LTE can actually be set to run at anything from 3 MHz to 20 MHz (for battery-life optimization), and it comes standard with 2 megabytes of RAM, expandable to a healthy 10 megabytes. Its weight, at 7 pounds, 13 ounces without modem, and its dimensions — 8½ inches by 11 inches by 2.2 inches — are considerable for a notebook, but this is a very powerful system.

The LTE, with its 20-MHz clock, was the fastest performer in these tests.  
**Score: Excellent.**

The LTE was the fastest performer at disk-intensive tests. **Score: Excellent.**

The LTE flawlessly ran all of our software tests. **Score: Excellent.**

The Compaq machine weighs 7 pounds, 13 ounces, which may be a bit heavy for some users. Its dimensions are larger than some other systems. **Score: Good.**

See Compaq, Page 67

## Everex Tempo LX



**E**verex's 7-pound Tempo LX is a high-quality machine. It is similar to the Compaq in terms of having a finished, well-rounded look and feel. The system is 12 inches by 10 inches by 2 inches and is easy to transport, but like many of the others, it could benefit from a handle.

The Tempo can be run at 16 MHz or a power-saving 8 MHz. The machine comes with 1 megabyte of RAM standard that is expandable to 3 or 5 megabytes. The hard disk is 20 megabytes and is currently not expandable. The Everex also comes at an impressive price and is backed by top support policies.

The Everex's time on these tests fell short of those of the two 20-MHz systems we tested. This was an outstanding showing.  
**Score: Very Good.**

The Everex's disk-intensive times were midrange. **Score: Good.**

The Tempo performed perfectly in our software compatibility testing.  
**Score: Excellent.**

At 7 pounds with dimensions of 12 inches by 10 inches by 2 inches, the Everex is easy to transport, but it would be easier with a handle. **Score: Good.**

See Everex, Page 67

## PERFORMANCE: SPEED / CPU-INTENSIVE APPLICATIONS

## PERFORMANCE: SPEED / DISK-INTENSIVE APPLICATIONS

## PERFORMANCE: SOFTWARE COMPATIBILITY

## PERFORMANCE: SIZE / WEIGHT



## Samsung Notemaster SX



The Samsung Notemaster SX, like the Texas Instruments Travelmate 3000, is tailored somewhat similarly to the Compaq LTE 386S/20. Although the Notemaster appears to be the same size as the TI and LTE, it is actually thicker and heavier.

The Samsung does, however, mimic the LTE's keyboard, with both the layout of the keys and the stiff keyboard feel. The Samsung's CPU speed is slower than the LTE's, using a 16-MHz clock instead of a 20-MHz.

## TI Travelmate 3000



TI's new Travelmate 3000 looks nothing like the old Travelmate, which we felt fell short in some areas in a previous review. (See product comparison, March 19, 1990, Page 55.) The system has been completely redesigned. The new 3000 is smaller and lighter than the previous system and is more solidly constructed. The 3000 appears to have borrowed from the Compaq LTE's clamshell design, but the Texas Instruments system has a somewhat more logical keyboard layout.

TI didn't stop there. They stepped up the innards of the system too, offering a 20-MHz, 80386SX processor with a standard 20-megabyte hard drive and 2 megabytes of RAM, expandable to 6.

## Twinhead Supernote SX



The Twinhead notebook was an impressive entrant in all areas except speed, where it was the slowest performer in our CPU- and disk-intensive tests.

Weighing just under 7 pounds, the Supernote SX is very lightweight and easy to carry, but it could use a handle. The Supernote SX comes standard with 2 megabytes of RAM, expandable to 4 megabytes. The standard hard disk is 40 megabytes.

## Zeos Notebook 386



Zeos' Notebook 386, powered by a 16-MHz clock, is a very solid system. Its light weight and impressive styling give it a sleek look and feel. This system is very comfortable to use, and it is also the lowest priced system in this comparison, backed by extremely impressive support policies.

Although the Zeos is somewhat large, the system presents no real portability problems. The larger size allows for a fairly large screen and a keyboard that approaches full-size dimensions.

## PERFORMANCE: SPEED / CPU-INTENSIVE APPLICATIONS

The Notemaster SX was a quick performer in these speed tests. **Score: Very Good.**

With its 20-MHz clock, we expected the TI to outpace the other 16-MHz systems in this comparison, and it did so on CPU-intensive tests as well as disk intensive. The TI did not, however, outpace the Compaq LTE 386S/20, though it came fairly close. **Score: Excellent.**

The Twinhead was the slowest performer on these tests. **Score: Satisfactory.**

The Zeos' CPU-intensive speed time was adequate for the group. **Score: Very Good.**

## PERFORMANCE: SPEED / DISK-INTENSIVE APPLICATIONS

The Samsung was among the better performers in this category. **Score: Good.**

The TI was somewhat slower than the comparable Compaq LTE 386S/20 in disk-intensive tests, but it was faster than the other 16-MHz systems. **Score: Very Good.**

The Twinhead was the slowest performer on these tests. **Score: Satisfactory.**

The Zeos' disk-intensive speed time was among the slowest times. **Score: Good.**

## PERFORMANCE: SOFTWARE COMPATIBILITY

The Samsung ran all of our compatibility tests well. In order to run both Lotus 1-2-3 3.1 and Windows 3.0, we had to change the setup to convert 384K of high memory that was reserved for shadowing to extended memory. **Score: Good.**

The TI passed all our compatibility tests with no problems. **Score: Excellent.**

The Twinhead performed perfectly in our software compatibility testing. **Score: Excellent.**

The Zeos, configured with 1 megabyte of RAM, ran all our software tests without problems. **Score: Excellent.**

## PERFORMANCE: SIZE / WEIGHT

The Notemaster SX weighs a midrange 7 pounds, 2 ounces. The system is 11 inches by 8½ inches by 2¼ inches, which makes it nice and compact. **Score: Good.**

The Travelmate 3000 measures 11 inches by 8½ inches by 1.8 inches and weighs 6 pounds, 1 ounce with its battery. This makes it an extremely small and light notebook — lighter than any in this comparison — in spite of its power. **Score: Very Good.**

The Twinhead weighs under 7 pounds with its battery, and its dimensions are 11 inches by 8.6 inches by 2.08 inches. It is one of the lightest machines we tested. **Score: Very Good.**

The Zeos Notebook 386, at 7 pounds, 2½ ounces, has a very manageable weight. The size — 12.3 inches by 10 inches by 2 inches — is larger than some other machines, but it is still manageable. **Score: Good.**

See Samsung, Page 67

See Travelmate, Page 67

See Twinhead, Page 67

See Zeos, Page 67

# Hunting se



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**ALR Venture 16-386SX**  
*(Continued)*
**Altima NSX**  
*(Continued)*
**Compaq LTE 386/20**  
*(Continued)*
**Everex Tempo LX**  
*(Continued)*
**PERFORMANCE: BATTERY LIFE**

The ALR's battery lasted for 2 hours, 33 minutes, and 10 seconds on our tests, which put it in the middle of the pack in battery life. **Score: Good.**

The Altima's nickel-cadmium battery lasted only 1 hour, 20 minutes, and 54 seconds on our tests—the shortest battery life we found. This time is just a few minutes above the 1 hour and 15 minutes we require for a satisfactory score. **Score: Satisfactory.**

The LTE's battery lasted longer than any other in this comparison, except the Samsung at 3 hours, 3 minutes, and 44 seconds. **Score: Good.**

The Everex's battery life of 2 hours, 36 minutes, and 48 seconds tied with the Zeos, and both systems were among the top scorers. **Score: Good.**

**PERFORMANCE: CAPACITY**

The ALR Venture comes standard with 1 megabyte of RAM, expandable to 5 megabytes. It has a standard 20-megabyte hard drive, with a 40-megabyte option. The floppy drive is a 1.4-megabyte internal. **Score: Very Good.**

The NSX comes standard with 2 megabytes of RAM, expandable to 8 megabytes. The system has a 20-megabyte hard drive, expandable to 60 megabytes, and a 1.4-megabyte 3½-inch floppy drive. **Score: Excellent.**

The Compaq comes standard with 2 megabytes of RAM, expandable to 10 megabytes. The standard hard disk is 30 megabytes, and there is a standard 1.4-megabyte floppy drive, as well as a 60-megabyte hard disk option. **Score: Excellent.**

The Everex comes standard with 1 megabyte of RAM, expandable to 3 or 5 megabytes. A 20-megabyte hard disk is standard, and there is currently no larger hard disk available. Also included is a 1.4-megabyte floppy drive. **Score: Good.**

**PERFORMANCE: SCREEN READABILITY**

The ALR's VGA display is 6½ inches by 5 inches by 8½ inches and has 640-by-480 resolution. The display is somewhat small and could be bigger because there is a fair amount of unused space on the display half of the system. Although the screen is quite sharp when viewed head on, viewing it at angles is difficult. On our screen taste tests, this system was judged to be middle of the road. **Score: Satisfactory.**

The Altima has the largest screen of any notebook in this comparison, and its font is not very bold. The NSX's VGA card has an on-board memory of 256K, and there are 16 shades of gray at 640-by-480 resolution. The brightness and contrast controls for the VGA work wonderfully.

The screen does wash out considerably from angles and is most comfortable to look at from directly in front of the machine. The Altima's display was judged to be average on our taste tests. **Score: Satisfactory.**

The Compaq's screen display is one of the best in this comparison. Its screen has a sharp, clear, bold, and readable look. The 16-gray-scale, VGA-compatible screen uses edelighting. This type of lighting gives the screen very even dispersion and makes the contrast and brightness of the screen even and smooth. The screen can be viewed from virtually any angle with little or no washout. This display was one of the favorites in our taste test. **Score: Good.**

The LCD on the Tempo is very similar to the Twinhead's. Both use the Stingray BIOS, but more importantly, they both use a rather thin font that is somewhat grainy. The resolution is clear and the screen does not wash out from angles. Members of our test panel preferred this display to several others. **Score: Good.**

**PERFORMANCE: KEYBOARD**

The Venture's keyboard is medium size and has a well-designed layout. The keys have a strong click and a fair amount of travel, which some users may not like. On our taste test the keyboard got mixed results: Some users loved it; some strongly disliked it. **Score: Satisfactory.**

The Altima's 83-key keyboard has very spongy action that may be difficult to adjust to. However, the keys are full-size and the arrangement of the keyboard is very logical. The keyboard was fairly well liked on our taste tests. **Score: Satisfactory.**

The 80-key keyboard has a very firm and tactile click. The keyboard could use some rearranging, as the cursor keys are not arranged logically. Overall, the keyboard is one of the most comfortable to type on for long periods. The function keys are small and will take some adjusting to. The keyboard received middle-of-the-road ratings on our taste test. **Score: Satisfactory.**

The Tempo's 82-key keyboard has a rather soft action with long travel. Overall the keyboard action does not inhibit quick typing. The placement of the keys is logical and the cursors are arranged as they should be. **Score: Satisfactory.**

**DOCUMENTATION**

The indexed documentation for the ALR is easy to read, with multicolor headings and subheadings. The illustrations are detailed, however, the explanations are somewhat shallow. Included with the documentation is a portable guide with extra information for use on the go. **Score: Good.**

Documentation for the Altima consists of a very small, indexed users' manual and a couple of DOS-related manuals. The users' manual covers most of the machine's basics but could benefit from better illustrations. **Score: Satisfactory.**

Compaq supplies the finest manuals and documentation of all. The documentation for the LTE is clear, concise, and explicitly detailed with illustrations.

There is a total of five manuals. They contain glossaries, indexes, and all the information that a beginner needs to become familiar with troubleshooting. **Score: Excellent.**

Documentation for the Tempo includes manuals for the operating system and a separate users' manual. The users' manual does a great job, and the language is clear and easy to understand. **Score: Very Good.**

**EASE OF USE**

The ALR's floppy drive sits on the side of this system, toward the front. This allows easier access than those positioned toward the rear of the system. Although the contrast and brightness controls are located in plain sight, they are extremely small and very difficult to adjust.

The Venture also comes with Digital Research's DOS 5.0, which is very similar to MS-DOS. DR-DOS memory management is superior to DOS 4.01's, allowing more space to load programs. Overall, the Venture includes some real ease-of-use extras. The only drawbacks are the contrast and brightness controls. **Score: Good.**

See ALR, Page 68

The Altima NSX is quite easy to use, and its large size may actually contribute to your ease of use, if you appreciate such extras as a full-size keyboard. The controls and their placement are logical.

However, this system's relatively heavy weight is an important factor in how easy you'll find it to use. **Score: Good.**

See Altima, Page 68

The LTE is very well balanced and can be propped on your knee for use during flight. The system's long battery life and good-looking display should prove to be big boosts in ease of use. With outstanding speed performances and no real shortcomings (with the possible exception of weight), the LTE shouldn't represent trouble in day-to-day use.

The LTE's screen brightness and contrast sliders work smoothly. The floppy drive can sometimes require extra effort to make sure the floppy is installed firmly. **Score: Very Good.**

See Compaq, Page 68

The Tempo is easy to use and overall has all of its switches and controls in easy-to-reach areas. Everex includes contrast and brightness controls that make the screen very adjustable and easy to look at for lengthy periods. **Score: Good.**

See Everex, Page 68

**Samsung Notemaster SX**  
*(Continued)*
**TI Travelmate 3000**  
*(Continued)*
**Twinhead Supernote SX**  
*(Continued)*
**Zeos Notebook 386**  
*(Continued)*
**PERFORMANCE: BATTERY LIFE**

The Notemaster SX's battery lasted for a very impressive 3 hours, 19 minutes, and 51 seconds in our tests. This time was the longest in this comparison. **Score: Good.**

Battery life is affected by the Travelmate's CPU speed setting, which reverts to 10 MHz when on battery power. You can alter the setup routine so it will run at 20 MHz on batteries. Our battery life test at 10 MHz resulted in a time of 1 hour, 48 minutes, and 5 seconds. The 20 MHz speed resulted in only a slightly lower time of 1:32:25. **Score: Satisfactory.**

The Twinhead's battery life was 2 hours, 21 minutes, and 53 seconds on our tests, which put it near the middle of the pack. **Score: Good.**

The Zeos' battery lasted 2 hours, 36 minutes, and 48 seconds in our tests. This tied it with the Evers Tempo, and both systems fell in the upper half of the pack for battery life. **Score: Good.**

**PERFORMANCE: CAPACITY**

The Samsung comes standard with a 20-megabyte hard drive, expandable to 40 megabytes. There is 1 megabyte of standard RAM, expandable to 5 megabytes. A 1.4-megabyte floppy drive is included. **Score: Very Good.**

The Travelmate 3000's 20-megabyte hard drive is not currently expandable. The system comes with a 1.4-megabyte floppy drive, and 2 megabytes of standard RAM are expandable to 6 megabytes. **Score: Good.**

The Supernote SX comes standard with 2 megabytes of RAM, expandable to 4 megabytes (a lower ceiling than is found with some of the other systems). It has a standard 40-megabyte hard disk, and a 60-megabyte disk is optional. A 1.4-megabyte 3½-inch internal floppy drive is standard. **Score: Good.**

The Zeos' comes with a 20-megabyte hard drive that is not yet expandable. This may be a significant limitation for some users. The base RAM is 1 megabyte, expandable to 5 megabytes. A standard 1.4-megabyte floppy is included. **Score: Good.**

**PERFORMANCE: SCREEN READABILITY**

The Samsung's 640-by-480 resolution triple Supertwist, sidelit VGA LCD was one of the clearest and sharpest we saw. Its 7-by-5-by-8½-inch (diagonal) screen is bright and easily read at angles. It has 64 gray shades and was well liked in our taste tests. **Score: Good.**

The Travelmate 3000 provides a 7½-by-5½-by-9½-inch (diagonal) VGA, 640-by-480 resolution screen. This triple Supertwist screen is very clear with easy-to-read characters and 32 gray scales. The display was fairly well liked in our taste tests. **Score: Good.**

The Supernote SX has a rather sharp screen display with a paper-white background. There is a thin, somewhat grainy font, but overall the screen is quite clear and vivid even from angles. Twinhead supplies the Supernote SX with auto-switching VGA that can switch the type of display depending on your software. This display was well liked in our taste tests. **Score: Good.**

The Zeos' VGA screen measures 7½-by-5½-by-9½ inches (diagonal) with a resolution of 640 by 480. The screen is sharp but difficult to see at some angles and proves to be a bit dark. The backlighting, which can be a necessity on those dimly lit plane trips, is only somewhat adjustable. The Zeos displays 32 gray scales. **Score: Satisfactory.**

**PERFORMANCE: KEYBOARD**

The Notemaster's keyboard has a very short key travel and a strong click. It does fall down in layout, with initial cursor keys, separate page up and down keys, and very small function keys. The keyboard was judged to be average in our taste tests. **Score: Satisfactory.**

The Texas Instruments' keyboard is very flat with a soft touch but a short key stroke. The function keys are especially small. The cursor keys sit in a diamond shape, but are undersized and there are no separate page up or down keys. This keyboard got average scores in our taste test. **Score: Satisfactory.**

The Twinhead's 80-key keyboard has small keys and is almost an exact copy of the Compaq LTE's keyboard. The action and keystroke on the Twinhead is far more forgiving than that of the LTE, in fact, it is quite soft and rather difficult to type on quickly because of the sluggish rebound and long keystroke. This keyboard was judged to be about average in our taste tests. **Score: Satisfactory.**

Although the keyboard has large keys, it also has considerably less key travel than many systems and feels slightly mushy. It is comfortable to type on. The Zeos' keyboard was judged to be middle of the road in our taste tests. **Score: Satisfactory.**

**DOCUMENTATION**

The documentation for the Samsung goes into plenty of detail and is laid out with numbered subheadings and illustrations. The manual's index is also complete. **Score: Good.**

The TI's documentation is well laid out. The guides are printed with easy-to-read subheadings and clear, step-by-step instructions. The books are peppered with small illustrations and charts. Also included are a glossary and very complete index. **Score: Very Good.**

The Supernote SX comes with documentation for both the operating system and the machine. MS-DOS 4.01 is bundled with the Supernote SX along with user manuals for the operation of the machine. The user manual is well organized and includes good illustrations that outline the machine and its components in an easy-to-understand language. There is a glossary, and a thorough technical reference, but no index. **Score: Good.**

The Zeos' documentation lacks detail, but is laid out in an easy-to-read format. The books are well illustrated, though they lack indexes. **Score: Satisfactory.**

**EASE OF USE**

The floppy drive for the Samsung is in the front of the machine. The brightness and contrast controls are all in plain sight where they are easily reached. The only real drawback to this system's ease of use is the keyboard layout. **Score: Good.**

The very small size and weight of this unit makes for simple portability. Having the floppy drive in the front eliminates fumbling around when inserting floppies. The brightness and contrast controls are in plain sight, with easy-to-use controls that are not easily knocked out of adjustment. **Score: Very Good.**

The Supernote SX is very easy to use, and the controls and placement of the controls are well thought out. At under 7 pounds, this system is lighter than some, and its display was one of the best of the group. Only relatively slow speeds might represent problems in day-to-day use. **Score: Good.**

The Zeos' mid-to-large-size design gives it a comfortable, solid feel in use.

The 1.4-megabyte floppy drive is located on the right side, at the rear. This positioning may make it hard to find. The controls are all mounted on the side, which allows for easy access, but the contrast and brightness controls are easily bumped, and as a result often have to be readjusted. Unlike the other systems, DOS was not included with the Zeos system. The Zeos system's lid hinge is mounted closer to the front than the hinges on the more common clamshell notebooks. This gives the lid room to open in tight spaces. **Score: Satisfactory.**

See Samsung, Page 69

See Travelmate, Page 69

See Twinhead, Page 69

See Zeos, Page 69

**ALR Venture 16-386SX**  
*(Continued)*

The ALR has a solid design. It has oversized hinges to keep the clamshell lid firm. The latches are tight, keeping them from coming loose when the lid is shut.

There is, unfortunately, no handle with this system. **Score: Good.**

**Altima NSX**  
*(Continued)*

The Altima is a bulky but well-designed machine. Attention to detail is evident on the case and its hardware. All of the controls work smoothly. The screen has very little play when adjusted and closes firmly. It can be difficult to open the cover because of the nonstandard working of its latches. **Score: Satisfactory.**

**Compaq LTE 386S/20**  
*(Continued)*

The LTE is extremely well designed. It is elegant looking, finished, and clearly a beautiful piece of technology. There is nothing about the machine that is unfinished or even underdone. The screen closes down snugly on the base and can be released via two spring clips located on either side of the screen.

The motherboard and the frame construction are flawless. **Score: Very Good.**

**Everex Tempo LX**  
*(Continued)*

Workmanship on the Tempo is impressive, and the case and controls work smoothly. The screen closes down snugly and releases via two spring clips that are located on either side of the screen. The hinge assembly that holds the screen is firm. The motherboard is logically placed and spacious without overcrowding.

**Score: Very Good.**

**SYSTEM DESIGN**
**SUPPORT POLICIES**

There is a one-year warranty, and direct technical support is available from 8 a.m. to 5 p.m. Pacific time on weekdays via a toll-free number. ALR also offers fax support. **Score: Good.**

There is a one-year warranty on the NSX, and Altima offers toll-free technical support between 8 a.m. and 6 p.m. Pacific standard time. There is also fax support. **Score: Very Good.**

The LTE 386S/20 comes with a one-year warranty; service is provided through authorized Compaq dealers. Recently, Compaq added toll-free answers to such questions as upgrade paths and configurations. There will be questions that are referred back to dealers. **Score: Satisfactory.**

There is a one-year warranty on the Tempo LX. Everex also offers a 48-hour repair policy for the year that the system is covered under warranty. Technical support is available 6 a.m. to 5 p.m. Pacific time, but it is not toll free. Fax support and BIOS support are available. **Score: Very Good.**

**TECHNICAL SUPPORT**

On one call to ALR's technical support personnel, we waited more than 10 minutes on hold, but subsequently, we received fairly prompt callbacks. We received very competent support. **Score: Satisfactory.**

Altima's technical support personnel were courteous and eager to help. We got through to them easily and found their knowledge of the system to be extensive. **Score: Very Good.**

According to results from an *InfoWorld* survey on technical support for Compaq's laptop line, users are generally pleased with the technical support they receive from Compaq dealers. **Score: Very Good.**

We contacted technical support on two occasions. On the first try, our question was answered quickly. On the second occasion, when asking the technician if CMOS setup could be accessed directly from a combination keystroke, the technician was not familiar enough with the machine to give a quick and decisive response. **Score: Satisfactory.**

**VALUE**

The ALR Venture notebook is \$2,795 with a 20-megabyte hard disk, which makes it an outstanding bargain, especially because even lower street prices can be found. The display on this system was judged to fall short of some of the other systems in our in-house taste tests; but overall, this system was an impressive competitor. **Score: Very Good.**

At \$3,499, the Altima NSX is priced above some other comparable notebooks, but is much less expensive than the Compaq. This machine is about as large and heavy as notebooks get, but if you prefer large displays and full-size keyboards, the extra weight may be justified. **Score: Satisfactory.**

The 386S/20 is powerful, but you pay for it. The base system with a 30-megabyte hard disk is \$6,499; the 60-megabyte hard disk model costs \$6,999. You can find street prices up to 50 percent lower, but these list prices are daunting for a portable system. If you can afford one, though, this notebook is an outstanding machine. **Score: Good.**

At \$2,999, the Tempo LX is an impressive bargain. Its hard disk is 20 megabytes and you can't go higher than that yet (Everex plans to offer a 40-megabyte option soon), but if you're willing to tolerate that limitation, this machine is a great choice. It's also backed by impressive support policies, including Everex's 48-hour repair policy. **Score: Very Good.**

**PRODUCT SUMMARY**
**ALR Venture 16-386SX**

**Company:** Advanced Logic Research Inc., 9401 Jeronimo, Irvine, CA 92718; (714) 561-6770.

**List Price:** \$2,795 (as configured).

**Features:** 80386SX, 16-MHz CPU; 2 serial ports; one parallel port; one VGA monitor port; one external keyboard port; 640-by-480 resolution LCD; 80387 coprocessor support.

**Options:** 80387 coprocessor; external fax/modem module (shipping soon); external hard mode drive (shipping soon); 20-megabyte hard disk, expandable to 40 megabytes; 1 megabyte of RAM, expandable to 5 megabytes.

**Pros:** Inexpensive; disk-intensive speed second only to 20-MHz systems.

**Cons:** Less expandable RAM than some. **Summary:** An inexpensive, midrange performer on most of our tests.

**PRODUCT SUMMARY**
**Altima NSX**

**Company:** Altima Systems Inc., 1390 Willow Pass Road, Suite 1050, Concord, CA 94520; (415) 356-5600.

**List Price:** \$3,499

**Features:** 80386SX processor; 83-key keyboard; VGA-compatible backlit LCD; built-in 2,400-bit-per-second modem; one serial and one parallel port.

**Options:** External 5 1/4-inch floppy drive; 80387SX coprocessor; 6 megabytes of additional RAM; in addition to 2 megabytes standard; external numeric keypad; 1.4-megabyte 3 1/2-inch floppy drive; 20-megabyte hard disk standard with a 60-megabyte hard disk option.

**Pros:** Quality design; expandable. **Cons:** Extremely heavy for a notebook; large, shortest battery life.

**Summary:** This system's large display and keyboard may compensate for its extremely heavy weight and its large size.

**PRODUCT SUMMARY**
**Compaq LTE 386S/20**

**Company:** Compaq Computer Corp., 20555 State Highway 249, Houston, TX 77070; (800) 231-0900.

**List Price:** \$6,499 (30-megabyte hard disk); \$6,999 (60-megabyte hard disk).

**Features:** 20-MHz 80386SX CPU; one serial, one parallel, one mouse port; 2,400-bit-per-second internal modem; 16-gray-scale, VGA-compatible, 640-by-480 resolution Supertastix flat-panel LCD.

**Options:** 2 megabytes of RAM, expandable to 10 megabytes; 1.4-megabyte 3 1/2-inch floppy drive (external 1.2-megabyte or 360K 5 1/4-inch drive optional); Conner IDA 30-megabyte 2 1/2-inch hard disk (80-megabyte drive optional).

**Pros:** Fastest, impressive battery life; low screen readability.

**Cons:** The most expensive system. **Summary:** Like its predecessors in the LTE series, this 386SX-based system is well designed, powerful, and fast.

**PRODUCT SUMMARY**
**Everex Tempo LX**

**Company:** Everex Systems Inc., 48431 Milmont Drive, Fremont, CA 94538; (800) 821-0806.

**List Price:** \$2,999.

**Features:** 80386SX; coprocessor support (80387SX); VGA-compatible, 640-by-480 resolution, 16-gray-scale backlit LCD; 82-key keyboard.

**Options:** 80387SX coprocessor; Internal 2,400-bit-per-second modem; additional battery packs; 1.4-megabyte 3 1/2-inch floppy drive; 1 megabyte RAM standard, expandable to 5 megabytes; 20-megabyte Conner IDE hard disk (no other hard disk options yet).

**Pros:** Impressive 48-hour repair policy; sharp, readable screen; logical placement of controls; relatively inexpensive. **Cons:** Not very expandable.

**Summary:** This inexpensive system didn't fall down significantly on any tests.



### Samsung Notemaster SX (Continued)

The Samsung's case, hinges, and switches are rugged. Its major design drawback is the power supply DIN plug; it has seven very small pins that are easily bent.

The power supply itself was also imperfect. On two separate units, the "quick charge" light would not go out. The units were charged over a two-day period and were found, regardless of the indicator light, to have a complete charge.

**Score: Satisfactory.**

Samsung offers free, toll-free technical support during West Coast business hours. The Notemaster comes with a one-year warranty, and both fax and BBS support are offered. **Score: Very Good.**

### TI Travelmate 3000 (Continued)

The Travelmate 3000 is quite solid. The double-hinge clamshell design keeps the lid steady. The controls are tight and we found no rattles. Unfortunately, there is no handle provided. **Score: Good.**

The Travelmate 3000 comes with a one-year warranty, end Texas Instruments offers direct, toll-free support. There is also fax and bulletin board support. **Score: Very Good.**

### Twinhead Supernote SX (Continued)

Workmanship on the Twinhead is quite impressive. All of the machine's controls work in smooth increments, the motherboard is free of rework, the screen has very little play and settles once adjusted. All of the latches for the battery and the I/O ports close snugly. The only detriment to the system is the flush screen opening latch, which requires a firm grip on the machine to properly force inward. **Score: Good.**

Free, toll-free technical support is available for Twinhead systems. There is a one-year warranty with the system. **Score: Good.**

### Zeos Notebook 386 (Continued)

The workmanship on the Zeos is quite impressive. We found it to be a sturdy unit. The system's dual-hinge design is quite stable, and the cover is solid. The handle has a simple design that we appreciated. **Score: Very Good.**

Zeos has outstanding support policies, with a 30-day money-back guarantee, a one-year warranty and 24-hour direct technical support. These kinds of support extras are not even offered by many top software vendors; such extras from a hardware company are impressive. **Score: Excellent.**

## SYSTEM DESIGN

## SUPPORT POLICIES

## TECHNICAL SUPPORT

Technicians from Samsung called back promptly, and we received fairly competent support. **Score: Satisfactory.**

We didn't get through to technicians immediately on our calls to TI and had to wait for callbacks, but we did get competent support when we got through. **Score: Satisfactory.**

We contacted technical support on two occasions and had questions answered quickly by knowledgeable technicians. Our second call required a call back, which came in 15 minutes, from a technician who knew a lot about the machine. **Score: Very Good.**

On our calls to Zeos' support personnel, we got through fairly promptly but it took technicians a relatively long time to answer our questions. **Score: Satisfactory.**

## VALUE

The Notemaster costs \$3,999 for a system with a 20-megabyte hard disk. The system with the 40-megabyte hard disk is \$4,499. These prices are relatively high, but the Samsung was also an impressive performer with the longest battery life. **Score: Good.**

The 20-megabyte Travelmate 3000 costs \$5,499; a 40-megabyte system is \$5,999. These prices overly rival the Compaq LTE's high prices and may be prohibitive for some buyers. You can definitely find less expensive notebooks, but the Travelmate 3000 was a solid performer and is very small and light. **Score: Good.**

The Supernote SX costs \$3,495 with its 40-megabyte hard disk and with 2 megabytes of RAM. This is a fairly inexpensive price relative to the other notebooks, especially since the hard disk is larger than some. We were impressed with this system, but it didn't perform as well as the others in our speed tests. **Score: Satisfactory.**

The Zeos only costs \$2,295 with a 20-megabyte hard disk and 1 megabyte of RAM. That gives it the lowest price of the notebooks we tested. We found it to be fairly average in most significant areas of testing, but we were extremely pleased with Zeos' support policies, which are the best of the group (including direct, 24-hour technical support). Its support policies combined with its low price make it an outstanding value. **Score: Excellent.**

### PRODUCT SUMMARY

#### Samsung Notemaster SX

**Company:** Samsung Information Systems, 3655 N. First St., San Jose, CA 95134-1708; (408) 434-5400.

**List Price:** \$3,999.

**Features:** 15-MHz 80386SX CPU; one serial and one parallel port; external VGA monitor port; external numeric keypad connector; PS/2 mouse connector; triple SuperTwist LCD; 80387 coprocessor support.

**Options:** 2,400-bit-per-second (bps) modem card; 9,600-bps send-only fax/modem card; external numeric keypad; 1 megabyte of RAM standard, expandable to 5 megabytes; 20-megabyte hard drive (optional 40-megabyte drive); 1.4-megabyte, 3½-inch floppy.

**Pros:** Longest battery life; impressive CPU-intensive speeds; better-than-average display.

**Cons:** Relatively expensive.

**Summary:** This system's battery life and display are its best points and it didn't fall down in any significant way.

### PRODUCT SUMMARY

#### Texas Instruments Travelmate 3000

**Company:** Texas Instruments Inc., P.O. Box 202230, ITG-068, Austin, TX 78720-2230; (800) 527-3500.

**List Price:** \$5,499 (20-megabyte system); \$5,999 (40-megabyte system).

**Features:** 20-MHz 80386SX CPU; one parallel and one serial port; one external VGA monitor port; external numeric keypad port; illuminated superTwist LCD; 80387 coprocessor support.

**Options:** Intelnet 2,400-bit-per-second modem; numeric keypad; 20-megabyte hard drive (40-megabyte option); 2 megabytes of RAM standard, expandable to 8 megabytes; 1.4-megabyte, 3½-inch floppy drive.

**Pros:** Fast (due to 20-MHz clock); very light and compact; expandable RAM; impressive support policies.

**Cons:** Relatively expensive.

**Summary:** This is an extremely light machine that was almost as fast as the Compaq system, also a 20-MHz system.

### PRODUCT SUMMARY

#### Twinhead Supernote SX

**Company:** Twinhead Corp., 1537 Centre Pointe Drive, Milpitas, CA 95035; (408) 945-0808.

**List Price:** \$3,495.

**Features:** 80C387SX 16-MHz CPU; coprocessor support; (80C387SX); VGA-compatible, 640-by-480 resolution up to 32 gray shades; backlit LCD; 80-key keyboard.

**Options:** 80C387SX coprocessor; spare nickel-cadmium battery; pocket fax/modem; pocket Ethernet LAN adapter; external 5¼-inch floppy disk drive; external numeric keypad; 12-volt auto DC/DC adapter; 1.4-megabyte, 3½-inch floppy drive; 2 megabytes of RAM standard expandable to 4 megabytes; 40-megabyte hard disk; 80-megabyte hard disk option; Smart Charge.

**Pros:** Good-looking screen; light weight.

**Cons:** Slowest performer on both CPU and disk-intensive tests.

**Summary:** The slowest system in this comparison does have a top-quality display.

### PRODUCT SUMMARY

#### Zeos Notebook 386

**Company:** Zeos International Ltd, 530 5th Ave., St. Paul, MN 55112; (800) 423-5891 (order); (612) 633-4591.

**List Price:** \$2,295 (20-megabyte hard disk).

**Features:** 16-MHz 80386SX CPU; one parallel and one serial port; one external video port; 640-by-480 backlit LCD; 80387 socket.

**Options:** Intelnet 2,400-bit-per-second modem; math coprocessor; DOS 4.01; 20-megabyte hard disk; not expandable; 3½-inch, 1.4-megabyte floppy; 1 megabyte system RAM expandable to 8 megabytes.

**Pros:** Inexpensive; sleek look and design; backed by superior support policies that include 24-hour phone support; fairly long battery life.

**Cons:** Relatively slow disk-intensive speeds; fewer expandability options than some other systems offer.

**Summary:** The most inexpensive system we looked at is a sleek-looking, well-constructed product.



# Performance That Draws Rave Reviews.

"One that stood out from the crowd, however, was the AST Premium Exec. . . a lot of notebook for the money, and easily upgradeable, too."

—New York Times,  
Nov. 29, 1990

"Loaded with desktoplike features, AST's bargain-priced Premium Exec line brings you the best of 386SX and 286 notebook technology."

—PC World,  
Feb. 1991

"AST's new portable is going to hit a home run. It covers all the bases with its excellent screen quality, great weight and unbelievably low price."

—Computer Reseller News,  
Nov. 26, 1990

"AST blasted the competition's inflated prices with two new offerings. . . to compete head-on with Compaq, Toshiba and T<sup>1</sup>."

—Landscape Report on Personal Computing, Nov. 1990

AST Reviews  
10  
The Way  
Business

AST's new Premium<sup>®</sup> Exec<sup>™</sup> has stolen the show. Critics say it's " . . . the first notebook computer, with features similar to Compaq's model but at a price tag half the size!"\* And that it has " . . . better features, such as a faster processor and more main memory than its counterpart from Toshiba. . . yet costs \$2,000 less."\*\*

What makes the Premium Exec 386SX so powerful is its 386SX processor, 20 MHz speed and up to 8 MB of RAM. So it delivers the high performance you need for memory-intensive programs like Windows 3.0. AST's other star, the Premium Exec 286/12, features 286-based processing that upgrades easily to 386SX power.

Both Premium Exec models feature crisp graphics and a spacious keyboard, so you can work for hours without eye strain or finger fatigue.

The Premium Exec can go on the road with you, tucked away in your briefcase. Yet it's versatile

enough to function as your primary desktop computer too, with ports to connect to a full-size VGA monitor, keyboard, and mouse. And to complete the ensemble, AST offers many portable options from modems to memory, chargers to keypads.

AST's service doesn't play second fiddle to anyone. All of our award-winning support programs extend to the Premium Exec. Plus, we've added a new option called ExecCare<sup>™</sup> that guarantees your service on your Premium Exec within 24 hours.

For a grand finale. . . the Premium Exec 386SX/20 costs \$2,000—\$3,500 less than competitors. Clearly, it's curtains for Compaq, Toshiba and other higher-priced notebooks. AST's Premium Exec has taken center stage. For more information, call 1-800-876-4AST.

\*Hill Times Journal, Dec. 26, 1990. \*\*David Rogers, Goldmine, Seba & Co., PC Week, December 18, 1990. AST markets products worldwide outside of the United States and Canada call AST International, (714) 737-7032 or fax us, (714) 737-7040. AST is a member to U.S. government agencies, General Service Contract Number G50K09MG30A4-P001 AST, AST logo and Premium registered. Data and ExecCare trademarks AST Research, Inc. All other brand and product names are trademarks or registered trademarks of their respective companies. Copyright © 1991 AST Research, Inc. All rights reserved.

	AST PREMIUM EXEC 386SX/20	COMPAG <sup>®</sup> LTI 386475	TOUGHBOOK <sup>®</sup> T2988X
Size	8 1/2 x 11 1/2 x 2 1/2"	8 1/2 x 11 1/2 x 2 1/2"	12 2 1/2 x 11 1/2"
Weight (lbs.)	7.3	7.5	6.8
CPU Speed	20 MHz	20 MHz	16 MHz
Hard Drive (Modem)	20 MB/40 MB/80 MB	30 MB/80 MB	20 MB/40 MB
Display Resolution	640x480 VGA	640x480 VGA	640x480 VGA
Gray Shades	32	16	16
Software Included	DOS, Lotus <sup>®</sup> 123 <sup>™</sup> , Battery Vault <sup>™</sup>	None	DOS
Price*	\$2790	\$4490	\$4990

\*Manufacturer's suggested list prices, 12/1/91

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## MULTIMEDIA

# Ask Me 2000: An Accessible Authoring System

Though multimedia has become a hot topic only recently, companies such as ICS have been developing multimedia products since 1988. ICS offers two multimedia authoring systems for DOS-based PCs: Ask Me 2000 and Ask Me Professional, which is geared toward serious developers of multimedia.

For this impression, we took a look at Ask Me 2000, Version 2.02, which retails for \$495 (compared to the professional version's less-accessible price of \$1,795). As a beta test site for Microsoft Corp.'s multimedia version of Windows, ICS is also at work on a Windows 3.0 version of Ask Me for release later this year. They

plan to preview the Windows version at Spring Comdex, in Atlanta, the week of May 20.

Ask Me 2000 lets you create presentations that can include text, color graphics, music, voice, still-motion video, animations, and other eye- and ear-catching details. (You must purchase Ask Me

Professional to get support for full-motion video.) The Ask Me environment doesn't offer any image creation tools, but you can import object-oriented or bit-mapped graphics and manipulate them, such as adding fill patterns, changing colors, etc. You can also import Autodesk Animator and 3D Studio FLI files and manipulate them.

Ask Me 2000 supports a wide variety of sound boards, including Creative Labs' Sound Blaster card. The program provides an interface to the various boards that includes MIDI (musical interface digital interface) support.

For creating scripts that link together all the pieces of your presentation, Ask Me 2000 supplies its proprietary authoring language, Stratos, which uses such English-language commands as Show and Speak. ICS provides 100 Stratos commands and 32 special effects, including such transition effects as sparkle, pour, and diagonal.

Every Ask Me 2000 application that you create is essentially a database file; by linking these files together with Stratos, you can create an interactive multimedia application. To distribute your presentations, you must purchase ICS' \$195 Ask Me Display application. In addition to providing you with a license to distribute unlimited copies of your presentations, Ask Me Display includes a utility, Appscan, which will scan your presentation and create a list of the executable and image and sound files you used, as well as set up your master disk. It also includes a self-modifying installation program that enables users to easily and quickly install your application.

The tools in Ask Me 2000 are decent, though you won't mistake your Ask Me 2000 presentations for those you can make with more powerful tools such as Aim Tech's more expensive Icon Author, or the Authorware system on the Macintosh. If you wish to create presentations of that caliber, you should consider Ask Me Professional. But the still-video, graphics, and sound tools in Ask Me 2000 work fairly intuitively, despite the fact that no one has yet set the standards for how multimedia applications are supposed to operate.

Ask Me 2000 can be used by someone who has never designed a computer-based presentation before. The documentation is a little thin, but with enough practice, you'll get the hang of it. In the hands of a more experienced multimedia person, Ask Me 2000 can really shine. However, to pull off some fancy effects, you'll need some programming experience, because the Stratos language demands a competent master.

ICS is currently at work on an update to Ask Me 2000; the most significant enhancements to Version 2.2 will be a custom menu generator and the capability to import and export blocks of Stratos commands between the different Ask Me applications.

Ask Me 2000 isn't a replacement for business graphics, spreadsheet, drawing and painting, or personal programming software. Instead, the application functions as a meeting place for the products of all of these kinds of software, where they can be combined into a single unified presentation.

ICS, 2534 26th Ave. S., Fargo, ND 58103; (701) 293-1004.

— Don Craib

## Where to get an earful next Sunday.

Tune in to the Business Radio Network each Sunday at one o'clock (PST), for "Computing Success" hosted by Thom Foulks.

InfoWorld is the exclusive high tech news source for this popular talk show. Every week, you'll hear from Michael J. Miller, InfoWorld editor-in-chief and other InfoWorld editors reporting industry and product news. Your local network affiliate is:

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950

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1540  
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1320

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WCVG-AM  
1320  
Cleveland  
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1420  
Youngstown  
WFNY-AM  
1330

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# BUYER'S ADVISORY

ANSWER LINE • BY BRETT GLASS



## 486 'Burst-Mode' Can Pack A Wallop, But Do You Need It?

**Question:** Could you tell me something about the merits of "burst-mode" technology

and whether some systems bring solid now have this feature? I've heard it accounts for thousands of dollars of difference in the price of a system

Name Withheld

**Response:** The Intel 486 chip has a special way of accessing memory—called burst mode—which lets it do four rapid-fire memory accesses in as many cycles of the processor clock. Because the i486 is a 32-bit microprocessor, a burst-mode read pulls 16 bytes of code or data into the i486's internal cache all at once. This is a very quick way to access memory; however, many motherboards aren't fast enough to support it. According to veteran motherboard designer Joe Qua of Arche Technologies, the RAM—usually part of an external cache—needs to have an access time of no more than 20 nanoseconds. Such fast RAM increases the price of the motherboard, so many vendors forgo burst mode and use slower parts instead.

Is it worth the money to buy a motherboard that supports burst mode? As always, it depends on your application. The i486's internal cache already does a good job of keeping the microprocessor fed with data, so the best external cache probably won't increase performance by more than a few percent under

DOS. But if you're running demanding system software (such as Unix) that stresses the CPU's internal cache, burst mode may be a worthwhile feature.

**Question:** My AUTOEXEC.BAT file copies all of my smaller programs, utilities, and batch files to a 1-megabyte RAM disk and sets the path so that everything loads at the RAM disk first, thereby executing faster than off the 150-megabyte hard disk. My problem is I can't get COMMAND.COM for DOS 3.30 to work from the RAM disk, even if I copy it there. Is there any way to have COMMAND.COM always execute from a RAM disk?

Name Withheld

**Response:** Changing your path isn't enough to make DOS look elsewhere for its command interpreter; you also need to change a DOS environment variable called COMSPEC. To do this, put in your AUTOEXEC.BAT the command: SET COMSPEC=X:\COMMAND.COM (where X is the letter of your RAM disk). Just to be safe, place this line after the lines that create the RAM disk and copy COMMAND.COM to it. Also modify your path (as you have been) so that the RAM drive comes before anything else. DOS (and applications that "shell out" to DOS properly) should look for COMMAND.COM on the RAM disk from then on.

**Question:** I recently purchased a 386 PC that works fine except that whenever I

write to a low-density 360K 5¼-inch diskette, I cannot read the diskette on my old XT-class Epson Equiper. Is there anything I can do to transfer data to the old PC for testing and to exchange with other XT-class users?

Hank Heyman

**Response:** Writing to a low-density disk with a high-density drive is a risky business; the high-density drive writes narrow tracks that not all 360K drives can read. My recommendation: Install a 360K drive on any machine that needs to write to low-density disks. Such drives usually sell for \$50 or so and will save you many disk-incompatibility headaches.

**Question:** Several people at my location are trying to run two printers (usually an HP LaserJet II and an HP PaintJet) from a single computer. There is confusion as to how to do this with reasonable ease and cost. HP advises not to use any switch—mechanical or electronic. They say voltage spikes upon switching can wipe out the printer input. Our local dealer says that they do it all the time without problem. Is there a way to do this short of buying a \$500 backup unit?

Roger Daisley

**Response:** Older HP laser printers have been known to burn up if attached to switches, though the new ones don't seem to have this problem. Still, the best way to handle a situation such as yours is not to use a switch at all. Why not give

each printer its own port? A second parallel port can be had for as little as \$30 from many retailers, and an IBM PC or compatible will accept up to three of them. You can also use a serial port to drive any printer with a serial interface. If you go this route, read the documentation on the mode command in your DOS manual to find out how to assign a printer name (LPT1, 2, or 3) to a serial port.

**Question:** In a previous column, you mentioned a Modula-3-to-C translator. How can I contact Digital Equipment Corp. to get hold of it?

Tom Bertolis, California

**Response:** To get information on Modula-3, write DEC's Systems Research Center at 130 Lytton Avenue, Palo Alto, CA 94301. The language is described in Research Reports 52 and 53. The translator is available via anonymous FTP from a computer called gatekeeper.dec.com. BLX also has a copy on-line.

Readers can leave questions for contributing editor Brett Glass to answer in this weekly column by calling (800) 227-8365, ext. 622 or by messaging Compuserve (72627,3673).

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## RESOURCES

### MARCH

6-7, Washington: CTC '91. The first annual conference on applying voice, data, image, and video to business. For information, Contact: Jess Seiple, Telecommunications Interchange Group, (201) 478-3606.

7-9, Washington: ECO '91: The Oracle Users Conference. This conference will include millennium on client/server architecture, CASE tools and techniques, etc. Contact: Les Pecca, (609) 231-1486.

7-10, San Antonio, TX: The ninth annual Computer-Based Training Conference and Exposition. Contact: Sue Deveaux, (617) 342-0146.

10-12, Anaheim, CA: Voice '91 Conference and Exposition. Contact: (714) 974-6637.

13-15, Seattle: The 11th Annual Telecommunications Northwest Teleconference. Contact: Bob Mannery, (206) 489-5252.

14-15, New York: Fourth annual computer virus and security conference. Location: World Trade Center. Contact: (202) 371-1013.

17-22, Anaheim, CA: Guide International's

ai's Guide 79 will offer more than 1,200 sessions. Contact: Guide Headquarters, (312) 644-6610.

19-21, San Francisco: 1991 AEC Expo West Conference. This conference will focus on advanced architecture, engineering, and construction automation and management. Location: Moscone Convention Center. Contact: Expocon International, (609) 987-9400.

26-28, San Francisco: The third annual DB/Expo will focus on innovations in distributed databases, object-oriented databases, tools, connectivity, and interoperability. Contact: Norm De Nardi Enterprises, (415) 941-8440, (800) 2DB-EXPO.

### APRIL

3-5, Anaheim, CA: The 10th annual Business America's Computer Conference and Exposition. More than 100 exhibitors will show the latest PC, midrange, and mainframe hardware, as well as software from the Pick and Unix markets. Contact: Monica Giobbi, (619) 578-3152.

10-12, Tucson, AZ: The Society for Information Management's 1991 Institutional Member Conference. The conference will help executives prepare for the future. Contact: (312) 644-6610.

14-18, Salt Lake City: IUA '91, sponsored by the IDMS User Association. Location: Salt Palace. Contact: (312) 644-6610, Ext. 6728.

16-17, New York: Lap and Palmsport '91. Contact: Peter O'Connor, (212) 682-7968.

22-25, Washington: The Usenix Association's Unix C++ Conference. Contact: Usenix Conference Office, (714) 588-8649.

28-May 1, Atlanta: The Assist 1991 conference has the theme "Solutions and Strategies Through Communication." Contact: Pam Stevens or Greg Dummer, (312) 644-6610.

28-May 1, San Francisco: Borland International's first annual International Languages Conference. The conference will feature presentations on developing applications for windowing environments, productivity, and OOP. Contact: CT Meeting Planners, (800) 942-TURBO, (203) 432-5388.

30-May 2, Anaheim, CA: Third Annual Federal Computer Conference. This conference is sponsored by the National Council for Education on Information Strategies. Contact: Stephen O'Keefe, (800) 343-6944.



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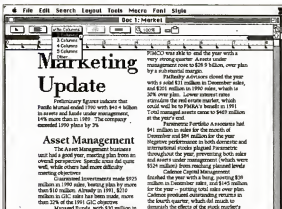


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## REVIEWS



WordPerfect 2.0 lets you control, via its improved ruler, the number of columns in your document.

## WordPerfect for the Mac Sports Powerful Capabilities

Version 2.0 improves its Mac-like interface, includes simpler menus and dialog boxes.

By BARBARA ASSADI REVIEW BOARD

(These language modules are available separately from WordPerfect Corp. for \$99 each.) Although WordPerfect doesn't allow you to backtrack to previously checked words, the program will alert you to double words and unusual punctuation.

WordPerfect's thesaurus can be activated via the Tools menu. This is much simpler than Microsoft Word, which uses Microtype's Word Finder (accessed from the Apple menu) as its thesaurus. We rate spelling checking and thesaurus good.

**Mail merge:** WordPerfect sports a functional mail-merge capability that, with this revision, now supports named fields and prompts that let the user know when text needs to be entered. However, conditional ("if/then" statements) are not directly supported in the mail-merge function. The program has a macro set up to use a template for three-up labels. We rate WordPerfect's mail merge very good.

**Layout:** WordPerfect's layout capabilities, formerly sold, have been greatly improved with Version 2.0. The program includes support for mixed-column documents, with columns that can be evenly spaced or set at varying widths. A new feature lets you create borders around a single character, a paragraph, a page, or a

set of columns.

Another new capability lets you determine whether graphics are anchored to a specific page or to a specific paragraph. WordPerfect doesn't, however, contain an integrated table editor like Word's. Rather, with WordPerfect you can use a columns feature on the document's ruler to create tables that you can later add dividing lines to by using the Borders dialog box. The main drawback to this method is that it is difficult to edit data. A preview option lets you view your document as it will print.

There is a solid feel to WordPerfect's layout powers, and implementing the features is more straightforward than in Version 1.04. We rate layout excellent.

**Graphics:** Graphics was an area in need of significant improvement. Version 2.0 has added an integrated drawing utility, and its tools incorporate a variety of box shapes, line weights, and fill patterns. The drawing utility operates by giving you three layers upon which you can create or import a graphic: behind text (as a "watermark"), within the text (as a typical graphic), or on top of text (as an overlay). WordPerfect displays the watermark only in page preview mode, which keeps the watermark from cluttering the screen. Graphics created with

Draw Overlay, however, are displayed even when the program is in the edit mode. We would like to see an option for turning off Draw Overlay during text editing.

The program now allows you to import graphic files directly, rather than from the clipboard. And although earlier versions of the program treated graphics as paragraphs so they would move with surrounding text, Version 2.0 lets you select whether you want graphics to be anchored to paragraphs or to the page. However, one minor drawback is that the program does not let you click and drag a graphic between pages; to move a graphic from page 2 to page 1, you must place it on the clipboard. Graphics can now be easily sized and scaled. WordPerfect's graphics are extremely complete for a word processor. We rate graphics excellent.

**Outlining:** WordPerfect includes a straightforward outlining feature that offers up to eight heading levels, as well as a variety of numbering options. Custom outline-numbering schemes are also supported. Unlike FullWrite and Word, WordPerfect's outliner does not let you rearrange outline entries by dragging them into position. Another outlining feature that we'd like to see is the capability to collapse or expand outline text. WordPerfect's outlining is satisfactory.

**Table of contents and indexing:** WordPerfect 2.0 supports a table of contents for each document with up to five levels of entries, as well as indexes with entries and subentries. Marking a word or passage for inclusion in the table of contents, index, or other list is easily done via a dialog box that you can leave open as you edit the document. This release includes a number of new options that allow you to create a table of authorities, cross-reference text in an index, and use a concordance (a document that contains a list of the words and phrases that you want to include in the index) for indexing. WordPerfect's table of contents and indexing capabilities earn a good score.

**Style sheets:** WordPerfect Mac 2.0 has very powerful style sheets. You can store text in styles, which is useful for bullets and headers. An option lets you easily create new styles based on previously created styles. And there's a unique "link" feature that lets you switch between as many as eight styles by just pressing the enter key.

Depending on the preferences you set, WordPerfect will either apply styles to the current paragraph only, like Microsoft Word; from the current paragraph down to the next style; or from the current cursor point down to the next style, like WordPerfect on the PC (this mode allows several styles in one paragraph). If you have highlighted text, in the character mode a style applies only to that text, whereas in either of the paragraph modes if one word is highlighted, the entire paragraph will be affected. The three modes make the product complex, but provide remarkable flexibility.

Unfortunately, we found a bug with line indents and styles. WordPerfect

WordPerfect has long been the leader in PC word processing, while its Macintosh counterpart has struggled to win the hearts of Mac users. WordPerfect's long-awaited Version 2.0 for the Macintosh attempts to bring more capabilities of the text-based PC version to a graphical platform. This update sports a more Mac-like interface in comparison to the previous version (1.04), and it includes simpler menus and improved dialog boxes. Although the program still doesn't compete neck-and-neck with Microsoft Word, it is a solid word processor that will hold its own against competitors.

We last reviewed Version 1.04 in our graphical word processor product comparison (August 13, 1990, Page 55). This review is based on criteria established in that comparison.

**Features:** WordPerfect 2.0 includes several new features, as well as improvements to existing ones. Formatting is now paragraph-based; when you make formatting changes, you can place the insertion point anywhere within the paragraph to effect the change. Version 2.0 also includes new drawing capabilities, and the program's graphics handling has improved. Other new features include style sheets; text boxes; a sort capability; and improvements to macros, search-and-replace operations, and index and table-of-contents generation.

### PERFORMANCE:

**Basic editing:** With this version, WordPerfect offers more of the editing features you would expect in an office/professional word processor (that category was last reviewed January 7, Page 51). Version 2.0 contains a ruler, which gives you the paragraph formatting options that earlier versions lacked. However, WordPerfect's ruler does not have all of its features readily available, as does Word. In Word there are no pop-up menus, whereas WordPerfect has four menus for tabs, alignment, zooming, and line spacing. The program is also capable of merging files directly and of merging multiple tables of contents. A new sort capability lets you sort highlighted text within a document, numerically or alphabetically. An improved Find/change capability lets you search for and replace text forward or backward through a document and is attribute sensitive. We rate basic editing very good.

**Spelling checking/thesaurus:** WordPerfect 2.0 offers a spelling checker that can suit a variety of needs. It offers both phonetic and typographic suggestions. WordPerfect also displays a list of alternatives automatically, so you don't need to prompt the program to suggest words as you do in Microsoft Word. You can also prompt WordPerfect to ignore highlighted parts of the text (such as acronyms) by marking them as "generic." You can also use that option to identify text in other languages, in which case WordPerfect automatically accesses the correct language module for checking the spelling.

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would not override a preset paragraph indent with a style by the Macintosh. WordPerfect has a fix for this bug in beta, which is scheduled to ship March 1.

Balancing the bug against overall flexibility and power, we rate style sheets very good.

**Font support:** WordPerfect supports all fonts supported by the Macintosh. It also supports some extras such as strike-through, shadow, and outlining, as well as an extensive range of font sizes. We rate font support excellent.

**Footnoting:** WordPerfect lets you use both footnotes and endnotes in a document, and offers a rich variety of formatting options. For example, you can use numbers, letters, or characters for numbering footnotes and endnotes. The program supports up to five different characters for footnotes and endnotes, and has an option that increases the count of these characters after they are used

once (i.e., if the first endnote is identified by \*, the second will become \*\*, and so on). One of the new macros shipped with Versuo 2.0 allows you to convert all footnotes to endnotes, and vice versa. WordPerfect's footnoting capabilities are excellent.

**Macros:** WordPerfect's macro capabilities are now unquestionably the best of any product in its class. Previous editions of the program offered capabilities to pause a macro, nest other macros in a macro, chain to other macros, and invoke dialog boxes. Version 2.0 now

includes a macro editor that lets you edit macros during or after their creation. It also comes with a library of predefined macros, some of which are useful for creating tables. You can have private libraries (of either styles or macros) that are unique to each user, and there can also be a common library that is useful for maintaining consistency within a group or corporation. We rate macros excellent.

**Printer support:** WordPerfect supports the standard Mac printers, including Image Writers and PostScript devices. We rate printer support very good.

**Compatibility:** WordPerfect supports the basic Mac document formats: ASCII, MacWrite, RTF, and WPG (DrawPerfect). It also accepts any WordPerfect document created on another platform (VAX, Unix, and IBM-compatible computers). The program imports any graphic created in another application, including MacPaint, EPS, and TIFF. We rate compatibility very good.

**Speed:** For nearly every function, WordPerfect performs with reasonable speed. It was slower than Microsoft Word 4.0 when importing ASCII text, and faster

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GRAPHICAL WORD PROCESSOR

#### WordPerfect for Macintosh

VERSION 2.0

Criterion	(Weighting)	Score
<b>Performance</b>		
Basic editing	(60)	Very Good
Spelling checker/thesaurus	(60)	Good
Mail merge	(20)	Very Good
Layout	(60)	Excellent
Graphics	(50)	Excellent
Outlining	(20)	Satisfactory
TOC and Indexing	(20)	Good
Style sheets	(20)	Very Good
Font support	(60)	Excellent
Footnoting	(25)	Excellent
Macros	(25)	Excellent
Printer support	(60)	Very Good
Compatibility	(60)	Very Good
Speed	(50)	Good
<b>Documentation</b>	(75)	Very Good
<b>Ease of learning</b>	(75)	Good
<b>Ease of use</b>	(130)	Good
<b>Error handling</b>	(40)	Good
<b>Support</b>		
Support policies	(20)	Excellent
Technical support	(20)	Good
<b>Value</b>	(50)	Good
<b>Final score</b>		<b>7.4</b>

#### PRODUCT SUMMARY

Company: WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057;

(801) 225-5000.

List price: \$495.

Requires: Macintosh Plus, SE, or II computer; 1 megabyte of RAM; hard disk; System 6.0.3 or later.

Pros: Includes a robust drawing utility and an improved user interface.

Cons: None significant, except the bug in the Styles function.

Summary: A feature-filled program capable of handling a wide range of sophisticated word processing duties.

than FullWrite 1.5 when saving a document and exporting an ASCII file. We did notice pauses during WordPerfect 2.0's automatic backup operations and when it refreshed the screen during text edits (on a Mac IIsi with an Apple full-page monitor). We rate speed good.

#### DOCUMENTATION:

Documentation for WordPerfect 2.0 consists of several manuals, including installation, reference, a tutorial, and separate manuals on macros and the drawing utility. There is also extremely informative on-line help. Documentation is very good.

#### EASE OF LEARNING:

Earlier versions of WordPerfect were closer in user interface to the DOS version, with many more code-intensive functions than 2.0. The tutorial workbook is a nice introduction to the product, and it is backed up by tutorial files on disk. We score ease of learning good.

#### EASE OF USE:

We welcome WordPerfect's decision to make the Mac program's interface more like other Mac programs. To their credit, 2.0's program designers have made the transition without compromising its long list of powerful capabilities. The addition of style sheets, and the move away from codes, make the program a good deal easier to use than its previous version. With its new interface, Version 2.0 is easier to learn than its predecessor. Because capabilities are accessed via menus, it's also easier to learn than the PC version. Whereas the PC version relies heavily on macros and function-key commands, Version 2.0 has pull-down menus and a freer interface. Ease of use earns a good score.

#### ERROR HANDLING:

WordPerfect prompts you to save your file if you've tried to quit without saving, and it also gives you the option of keeping a backup file each time you save. The program includes a timed backup feature that lets you specify how often you would like to have the current document saved to a different file name, and it has a single-level undo command.

For nearly every error condition, WordPerfect advises you with a dialog box. However, we encountered one instance where the program should have had a dialog box and didn't, when we tried to print a document with the printer turned off. Most Macintosh packages alert you to this condition by displaying a dialog box that tells you the program is unable to find the printer. In WordPerfect 2.0, no message is displayed. A fix for this will also ship March 1. Other than this one minor snafu, WordPerfect's error handling is above average. We rate error handling good.

#### SUPPORT:

**Support policies:** WordPerfect Corp. provides unlimited toll-free technical support from 7 a.m. and 6 p.m. Mountain time. Monday through Friday. The company also offers 24-hour support via a toll call. A corporate support plan, fax support, and BBS support are also available. WordPerfect offers a 90-day money-back guarantee. We rate support policies excellent.

**Technical support:** In nearly every instance, our calls to WordPerfect technical support were answered within the first three rings. For one call, we were on hold for 4 minutes, but during the wait a recording gave us an update on our wait status, letting us know that there were three Mac support calls ahead of ours and giving us an estimate of how much longer we would need to wait—a thoughtful touch. During our calls to technical support, the technicians with whom we spoke were all helpful. Technical support earns a good score.

#### VALUE:

At \$495, 2.0 is now priced \$100 higher than either Word 4.0 or FullWrite Professional 1.5. With the inclusion of style sheets, the capability to create tables, editable macros, and the drawing utility, the program fares well in relation to its competitors. WordPerfect is a good value.

Barbara Assadi is the manager of employee communications for a major financial services company. She also lectures and consults independently on desktop publishing.

## Zenith Z-386 Mixes Unusual Set of Features

33-MHz 386 desktop PC is primarily for file server applications.

By VICTOR N. GARZA, TEST CENTER  
AND TRACEY CAPEN  
ASSOCIATE REVIEWS EDITOR

Zenith Data System's Z-386/33E is an EISA-based 33-MHz 386 desktop PC designed primarily for file server applications. The system includes an unusual combination of standard features. It has a caching disk controller for better server performance, but also comes with Microsoft Windows and a Microsoft mouse—items generally not used in a file server.

As a stand-alone workstation, the Z-386/33E turned in mixed results. It tied NEC's Powermate 386/33 for the second slowest CPU throughput, and it was 17 percent slower than Arche Technologies' File-386-33 (the fastest in this category).

The Z-386/33E had better disk speed, due in part to its DTC caching disk controller. Turning in the third fastest disk-intensive throughput in its class, it was 12 percent slower than AST's Premium 386/33TE (our disk-intensive speed leader).

What the Z-386/33E lacked in workstation performance, it made up in file server speed. It had the second fastest throughput among 33-MHz 386s—just one second slower than ALR's Business VEISA-386/33.

Except for one minor hitch, the Z-386/33E performed well in our software and hardware compatibility tests. When exiting from Lotus 1-2-3, Version 2.2 to DOS, the system repeatedly hung. To fix this problem (a conflict between the Z-386/33E, Lotus and QEMM 5.1.1), we had to add "EXCLUDE=E000-EFFF" to the QEMM386SYS line on our configuration file. We have not seen this conflict with other PCs.

Our attempts to run Novell's NetWare 386 uncovered other uncommon features in the Z-386/33E. We discovered that it did not have drivers for NetWare 386, Version 3.1 at the time of our testing and, consequently, we ran our file server throughput tests with Version 3.0.

Although the Z-386/33E had no difficulty completing our network test suite under Version 3.0, downloading and restarting the server proved to be clumsy. NetWare 386 uses a small DOS partition on the server's hard disk to boot the LAN operating system. The Z-386/33E, however, cannot find the DOS partition when you down the server. Zenith Data's inelegant solution is to use a floppy disk to boot NetWare.

The Z-386/33E is at the top of the price scale compared to other 33-MHz 386 PCs we've reviewed. The workstation configuration is about \$600 higher than a comparable Compaq's Deskpro 386/33L. Prices for the file server configuration are approximately the same. Balancing price against performance, the Z-386/33E is a satisfactory value.



33-MHz 386 EISA Computer

### Zenith Data Systems Z-386/33E

Criterion (Weighting) Score

#### Performance

Speed—  
CPU-intensive (100) Satisfactory

Speed—  
Disk-intensive (75) Very Good

Speed—  
Multitasking (75) Good

Speed—  
File server (100) Very Good

Compatibility (175) Very Good  
Lacks Netware 386 3.1 drivers.

Expandability (75) Good

Documentation (50) Very Good

Setup (75) Very Good

Serviceability

System design (50) Good  
A few patches on motherboard.

Support policies (50) Poor  
Dealer-only support.

Technical support (75) Very Good

Value (100) Satisfactory

Final score **6.8**

#### PRODUCT SUMMARY

Company: Zenith Data Systems Corp., 1501 Feenhan Road, Mount Pleasant, IL 60056; (708) 699-4800, (800) 953-0331.

List Price: \$10,599 for workstation configuration; \$16,191 for the server configuration; sold through dealer channels.

Features: 33-MHz zero-wait-state 80386 CPU, switchable to 16 MHz; EISA bus; two serial, one parallel port; Intel 80387 or compatible; Weitek math coprocessor support; 1.98-watt power supply; Windows 3.0; DOS 4.01; Microsoft mouse.

Peripherals: Enhanced keyboard; Zenith 16-bit VGA board.

Storage and Memory: Workstation: 150-megabyte Miniscribe drive with Zenith ES0/SCSI caching 1:1 controller; 1.44-megabyte 3½-inch floppy drive; 4-megabyte of 80-nanosecond RAM (SIMMs, 16 megabytes minimum); 16K of 15-nanosecond RAM cache (54K maximum).

File server: Two mirrored 320-megabyte Seagate drives; 8 megabytes of RAM. Price: Above-average file server speed; technical support.

Cons: No NetWare 386 3.1 drivers. Summary: Zenith Data Systems targets its Z-386/33E for file server applications, and in that capacity, it is a solid performer.

#### BENCHMARKS

INFO  
WORLD

### Graphical Word Processors

	WordPerfect Version 2.0	WordPerfect <sup>1</sup> Version 1.04	FullWrite Professional Version 1.5	Microsoft Word <sup>2</sup> Version 4.0
<b>File<sup>3</sup></b>				
Load	0:06	0:03	0:07	0:02
Save	0:02	0:01	0:03	0:01
Import ASCII	0:11	0:04	0:11	0:01
Export ASCII	0:24	0:06	0:43	0:04
<b>Cursor movement</b>				
Top to bottom	0:03	0:06	0:03	0:03
Manual scroll <sup>4</sup>	0:37/0:38	2:27/2:34	1:56	2:01/2:40
<b>Search</b>				
Last word	0:03	0:04	0:03	0:02
Global replace	0:17	0:05	1:05	0:07
Append file	0:04	0:25	0:12	0:20

<sup>1</sup>Times are in minutes.seconds.

<sup>2</sup>Reviewed August 13, 1990. Page 55.

<sup>3</sup>If file size is approximately 50K, 17 pages.

<sup>4</sup>The first time is using the keyboard, the second time is using the mouse.



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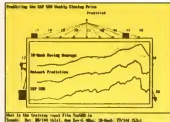
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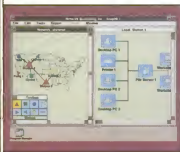
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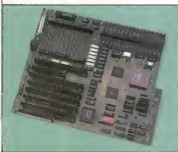
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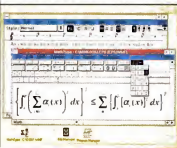
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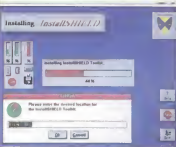


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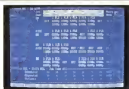


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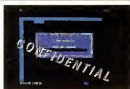


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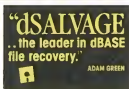
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## First Look

Continued From Page 1

Like Ami, Professional Write Plus allows you to add graphics to your documents by placing frames in the text, then bringing in graphics. You can place either text or graphics in a frame, make the frame transparent or opaque, and choose whether you want text to wrap around the frame.

ProWrite Plus supports a huge range of graphics formats. For most formats, you can rotate, scale, and crop the images, depending upon the limits of the image format.

You can set the number of columns for a document, but change them within a document (so that one section has a different number of columns than another) requires using frames. This can create some limitations.

Other word processing features include multiple rulers, a basic mail merge, footnotes, inserting variables and annotation notes, and a multiple-level undo. You can import and export files from many popular word processing formats, including WordPerfect, Word, Word for Windows, and Professional Write (it will read Ami files directly).

Like Ami, it has several different views to choose from, including a draft mode and several layout modes, including working (which shows your full text at 91 percent) and standard (which shows your project at 100 percent).

What's missing, compared with the high-end word processors? The biggest limitation is probably the lack of macros or even a glossary feature. Also, the program does not have a table-creating and editing feature, outlining, or the capability to

create indexes or tables of contents. One annoyance it shares with Ami Professional is that you can only open one document at a time in the primary word processing window. However, you can open another copy of Professional Write with a second document.

On the other hand, Professional Write Plus has two features I hadn't previously seen in a Windows word processor. The first of these is the Grammarik grammar checker. By pulling down "Grammar" from the same menu you'd choose for running the spelling checker or thesaurus, you move into the grammar checker with your current document.

In general, Grammarik is a very good grammar checker with many options, but it has been customized to work with ProWrite Plus. For instance, it uses different editing keys and won't let you delete ProWrite paragraphs (and complains when you delete extraneous spaces). Still, I suspect this could improve many business letters.

The other innovative feature is built-in electronic mail. With this option, you can send and receive electronic mail directly from within the word processor, if you connect to a network that is running the Novell/Action Message Handling Service (MHS).

The E-mail feature lets you send your current document immediately, send a message or just selected text, read messages, and maintain an address book.

In summary, Professional Write Plus, at a price of \$249, is a great choice if you want to produce basic letters, memos, and reports, include graphics, and check the spelling and grammar.

Software Publishing Corp., P.O. Box 7210, 1910 Landings Drive, Mountain View, CA 94039-7210; (415) 962-8910.

## Pen

Continued From Page 1

the motherboard and storage devices in these machines will be housed behind an LCD screen, Singh said. The keyboard will be detachable, so that users can go into a meeting with only the screen portion and then plug the keyboard to use the computer for data entry.

Microsoft will make Pen Windows capable of switching between landscape and portrait screen display modes, but users will have to reboot each time they change modes in the first release, Singh said.

Singh expects some early machines to cost as little as \$400, but more than notebooks currently on the market, he said. Users will likely see three or four new pen-based systems available before year end, he added.

The list of companies an-

nouncing support for Pen Windows includes four of the six largest laptop computer manufacturers: Toshiba, NEC, Grid Systems, and Seiko-Epson; as well as consumer electronics giants Sanyo, Fujitsu, Hitachi, and Samsung; and systems vendors NCR and Wang. A handful of start-ups have also pledged support for Pen Windows, including future pen-based computers, Summagraphics, and the Eden Group.

But most of the companies on Microsoft's support list say they haven't decided whether they will use Pen Windows or Go Corp.'s PenPoint.

In fact, no machines have been announced yet, and some hardware manufacturers, such as IBM, say they are engaged in the laboratory development phase.

Several manufacturers say they are keeping their options open, and their systems may

## IBM

Continued From Page 1

show an expertise in such tools, was rumored to be providing such a tool. Company officials declined to comment.

Although IBM will dominate this campaign, it will not have an anti-Windows or anti-Microsoft theme to it, sources said. It is designed to reach the hearts and minds of its hard-core corporate accounts — a market Microsoft does not fully understand, sources added.

IBM, however, does realize "certain marketing opportunities" in the DOS and Windows markets but will pursue them from a "decentralized level." Sources indicated that Windows will probably never be as significant as OS/2 in IBM's plans.

In its upcoming seminars, IBM will emphasize OS/2 2.0, the 32-bit version, over version 1.0, the 16-bit version. It will stress that 2.0 is where much of the product's future lies. With the 32-bit version, IBM believes it can leverage its strength against competitive offerings, including Windows.

Top IBM officials believe a successful OS/2 could bring IBM as much as \$500 million in revenues a year or two after its release, sources said.

"IBM realizes it is a chicken-and-egg time for OS/2," said one source familiar with the company's upcoming plans. "Users won't buy it because there aren't enough applications and ISVs won't develop because the user base isn't there."

Adding muddling its message for almost four years, top IBM officials have recently said they plan to be much more vocal about the positioning and long-term importance of OS/2 to their plans. However, IBM declined to comment on its marketing plans for OS/2 this year.

also support PenPoint. Most of the computer manufacturers who announced support for Pen Windows last week — Grid and NCR — have also announced support for PenPoint.

"It can't cost them much to stand up there and put their arms around Bill Gates," said Richard Shaffer, editor of New York-based *Computer Letter*. "This is part of the psychological warfare. What really matters is how much ground you capture — and that remains to be seen."

We have selected Pen Windows as one of the platforms for development in the pen-based arena," said Tom Martin, vice president of marketing for Tohosh America Information Systems Inc.'s computer systems division in Irvine, California. "Our approach is essentially an agnostic one. Both systems have benefits and drawbacks," he said.

## HP and Sun Submit Proposal for Compound Documents on Nets

By STUART J. JOHNSON

Hewlett-Packard Co. and Sun Microsystems Inc. last week submitted a proposal to the Object Management Group (OMG), that would make it easier for users to create compound documents that include objects on different platforms on a network.

The two companies have asked OMG to consider their object management facility as its standard Object Requester Broker (ORB). The group is expected to decide this spring.

The HP/Sun proposal combines the Object Management Facility of HP's New Wave with the NCS networking protocols of Unix International, as well as the NCS protocols adopted in the Open Software Foundation's DCE. Initially, the two network operating systems will not be capable of interoperating using the ORB, said David Cardinal, Sun's director of desktop applications and environments.

Down the road, "We can have both [OMG and NCS] co-resident on a common Ethernet wire," said HP's Jeff Liotta,

operations manager for HP's Cooperative Object Computing Division/East. This could bridge a major gap between the Open Software Foundation's DCE and Unix International's ODC.

The winning technology must be demonstrated in mid-April, according to Richard Soley, OMG's vice president and technical director. Six other companies have proposed technologies for the ORB, he added.

Although OMG is primarily composed of Unix companies, the HP/Sun submission is also intended for other environments, said Bill Crow, chief architect of HP's New Wave.

Microsoft has recently joined OMG, sources say, prompting speculation that Microsoft might adopt the ORB in order to extend its Object Linking and Embedding capabilities across networks, and possibly abandon efforts to use Dynamic Data Exchange.

Soley would not confirm Microsoft's membership, but said that both Microsoft and IBM have attended committee meetings. Novell has not joined the OMG.

## 386

Continued From Page 1

ing rationale to help users justify the choice," he added.

AMD's 386 has passed compatibility tests from five vendors and is being considered by 20 more manufacturers, said one analyst.

"We have the latest version, and I would say it's ready to ship," said one manufacturer who will ship a product in April.

While AMD's plans to chal-

lenge Intel's lock on the 386 are well known, his PC manufacturers will want to see how the chip shakes out before committing to anything.

One smaller manufacturer is already committed to using the 40-MHz AMD chip rather than Intel's stripped-down 486. Intel has been willing to let some of the stripped-down 486 or how much it will cost. "I think we can build a system around the AMD chip that will be just as fast for the same cost as a stripped-down 486 system," the manufacturer said.

## DOS

Continued From Page 1

what users would pay for the equivalent in LAN hardware.

DR Multisizer DOS supports a range of terminals through a bundled emulation program. The number of users supported is limited by the number of ports available and users' needs for certain performance levels.

Employing the same memory-management techniques used in DR-DOS 5.0, users can move most of the operating system, as well as terminate-and-stay resident programs and device drivers, above the 640K memory barrier. This gives each of several concurrently running DOS applications about 570K of memory.

DR Multisizer DOS is scheduled to ship by the end of March and will carry a suggested retail

price of \$695.

Microsoft, in the meantime, will make two versions of its upcoming DOS 5.0 available — one for OEMs and a generic upgrade that will be distributed by dealers — by mid-June, according to dealers briefed by the company.

The generic retail version of DOS 5.0 is expected to cost just under \$100, and it allows all users with DOS 2.1 or later to upgrade. This generic version, however, is not the complete upgrade. Microsoft's usual network of OEMs will sell, sources said.

Microsoft has extended the beta period in order to test the operating system with Novell Inc.'s and other vendors' network drivers.

A Microsoft spokeswoman declined to comment on the reports.

— Stuart J. Johnson contributed to this article.



## Q&amp;A: QUINDLEN AND ALSOP • BY RUTHANN QUINDLEN

## Is IBM Overcoming Its 'Wimp Factor' Image With OS/2?

Remember when everyone was calling George Bush a wimp? National magazines ran major stories about what they called the "wimp factor" in national politics. But just as Americans have discovered a definite backbone within a seemingly self-effacing and cautious person so the personal computer industry discovered a certain stately resolve within the formerly indecisive bureaucracy of IBM.

The first and most telling indication of this new resolve is the recently announced strategic relationship between IBM and network giant Novell Inc.

There are many implications arising from IBM's new support of NetWare. The first positive result is a quid pro quo for both parties: Novell gets to move NetWare out of the tactical solution category and into the strategic solution category with both its customers and IBM. In the same vein, IBM gets to move OS/2 out of the tactical solution category and into the strategic solution category, hopefully with its customers, and now definitely with Novell.

Where previously Novell had been providing only token support of OS/2 to the client, it is now committed to eventually supporting OS/2 on both the client and server. Similarly, though IBM has pledged that OS/2 LAN Server will continue as a strategic networking product, it has also committed to supporting

both LAN Server and Novell's NetWare equally.

The second interesting aspect of IBM's new resolve is that it has shown some real initiative vs. its major hardware competitors, primarily Hewlett-Packard and DEC. At any time during the last few years, either of these two hardware manufacturers could have undertaken such a relationship with Novell, and their customers would have welcomed it. Instead, both manufacturers chose to ignore customer requests, stick to a proprietary formula, and only marginally support NetWare.

Only Apple has so far attempted to match IBM with its new focus upon open networking. Much like IBM has done with Novell, Apple has done this through a relationship with an independent third-party software developer — Farnsworth Computing — dominant in Macintosh networking.

IBM's bold stroke with Novell has also significantly changed IBM's relationship with Microsoft. This aspect is important, not because of the politics or personalities involved (although those make for entertaining stories), but because this move reveals how determined IBM is to support OS/2. IBM will no longer rely upon Microsoft either to market OS/2 or to attract independent software developers to develop applications for it. Instead, IBM clearly plans to undertake those tasks itself. The agreement with Novell is its opening move.

There are rumors circling in the industry that IBM is making major efforts to co-opt software developers into undertaking significant new development projects for both OS/2 and Presentation Manager. And supposedly, IBM is planning a major announcement about OS/2 and its future within the next few months. Most customers and application software developers, however, having been burned by Presentation Manager and OS/2 before, are naturally wary.

But IBM is showing a new resolve: that it is prepared to do whatever it takes to make OS/2 a success. The IBM/Novell agreement may be a good indicator of the lengths to which IBM is prepared to go. As some industry analysts have been quick to point out, this agreement is the first time IBM has agreed to sell and support a strategic logo product on a non-exclusive basis.

Another important outcome of the agreement between IBM and Novell is that it may break up the networking logjam created by the battle between Microsoft and Novell. IBM, by also choosing to work with Novell, may become the mediating influence between these two warring factions. This is a good thing for customers. Previously, customers were afraid to bet on NetWare because of concerns about where IBM and Microsoft were going with OS/2. And Novell had been ignoring OS/2 in order to deny Microsoft an easy entry into networking via OS/2. The end result has

been confusion and apprehension among both customers and applications software developers.

The final and most critical outcome of the IBM/Novell agreement is that it will improve IBM's relationships with its customers. IBM customers have supposedly requested for years such features as Novell's IPX standard in IBM routers. Perhaps IBM has finally discovered that it cannot dictate SAA — that this strategic umbrella must be from the bottom up and driven by customers.

IBM's efforts to shore up its struggling OS/2 position, along with its wimp image, are positive in any number of ways. After all, power vacuums, in business as in international politics, do not encourage stability.

And who knows what new gains this resolve on the part of IBM may bring? Perhaps IBM will go so far as to end its tiff with Microsoft and embrace Windows just as it has embraced NetWare. After all, it appears that the relationship of Windows to OS/2 Presentation Manager differs little (from a customer point of view) from the relationship of NetWare to IBM's LAN Server.

*Ruthann Quindlen is a vice president at Alex. Brown & Sons. She alternates each week in writing this column with Stewart Alsop, industry analyst and editor of PC Letter. The views expressed are her own and do not represent the position of Alex. Brown & Sons.*

## NOTES FROM THE FIELD • BY ROBERT X. CRINGELY

## Death to the Infidels! Microsoft Declares Holy War on Windows ISVs

Presuming that Operation Desert Storm is really over, that America has pulled its record up to 11-1, what's rolling off into the history books is more than just a military victory, it's also the mother of all excuses.

"The dog ate my homework," is nothing compared with, "We know you've been waiting three months for your Sparcstation 2, but all production is going to Operation Desert Storm."

How can you argue with that?

**COLLATERAL DAMAGE.** The 1989 earthquake was a good excuse around here. I milked it for weeks, cultivating the image of Pammy and me, struggling out from under the splinters of our former home. But Desert Shield was even better, since it worked nationwide. I've had reports of at least a dozen companies using Desert Storm to explain late shipments. Some of them were probably telling the truth.

But there is no excuse for Microsoft. Salesfolks from Redmond were last week talking to a select group of large resellers, offering lump sum rewards of up to \$100,000 per store for meeting newer/higher market share quotas for the next trimester in product categories such as spreadsheets and presentation graphics.

According to these retailers, the *raison d'être* of this operation is to make Microsoft the only surviving Windows developer two years from now. I wonder how Bill's Windows evangelists will handle



this one?

**HELP!** The word from Lotus, where all late product excuses are beta tested, is that 1-2-3 2.3 is still quite bulky. With the help files alone taking up 700K. Also, there's a Lotus group working on an Improv-to-Windows port to go with the Next, OS/2 character, and OS/2-PM versions already up and running.

Not late at all is 1-2-3 for Windows, code-named Rockport, which will fall into beta tester's hands in late March.

**MAN BITES COMPUTER.** Lateness isn't his deal. Everything I do is late. This column is late. What bugs me is when the product is not only late, but ends up missing lots of promised features. At the

other extreme, and completely beyond my experience, is when a product appears offering significantly more than was promised. That's the happy case with Momenta. Folks who are working on a killer pen-based computer.

Momenta's hardware is reportedly better than Geo's or any of the other companies that have so far displayed their pen-based systems. And Momenta's software (like Geo, they've done their own OS) is supposed to be even better than Geo's, which means it's *stupidulous*. The only problem for Momenta is that they can be a hardware company or a software company, but they don't have enough money to be both. They're trying right now to decide what business they're really in.

**HARITUAL MEANS MORE THAN ONCE.** Pammy understands late too. No, the rabbit didn't die, but her 30-page report on nerd mating habits may never be born.

"What am I going to do, Bobby?" she asked, staring, panic stricken, into a blank computer screen.

"With that topic, I think you have a good argument that 30 pages is just too long." I suggested. "Offer them 10 pages and an appendix."

"Your appendix or mine?"

Pammy thinks everything is negotiable, and she usually gets her way. She could teach IBM a thing or two about negotiation, though Big Blue seems to be doing a pretty good job on its own lately

against Intel. The issue is pricing for 386 processors, which IBM buys from Intel and also builds itself. Trying to get a better deal, the kids in Boca are threatening to jump to the AMD 386 clone, which would produce no royalties at all for Intel, whose resistance to the idea of price cutting is rapidly fading.

**FRATERNIZING WITH THE ENEMY.** Another good technique for explaining why a product is delayed is to link it to someone else's delayed product. Microsoft Word 4.0 for the Mac has supposedly been sitting on the shelf for months in Redmond, waiting for Apple's System 7.0 to ship.

Then there's DEC's killer \$5,000, 33-MHz R3000-based code DECStation, which is apparently ready to go, except that Digital, in another retarded marketing move, has delayed the machine for several months so it can be released along with some new VAX hardware.

"There's no way I can get this paper done in time, Bobby! What if I tell my teacher that the computer ate my homework?"

"Better still," I suggested. "I'll drop off a note saying you've enlisted."

Wouldn't THAT be a morale booster? To discuss industry secrets and the prospects for world peace, give me a call at (415) 329-3555, or MCI-CRINGE.

# There's more to comparing LaserJet printer sharing options than just the name

	Pacific Data Products Pacific Connect™	Hewlett-Packard HP ShareSpool®
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